DRAFT

Pollution Prevention Report and Two-Year Workplan

2006-2008

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Pollution Prevention Report and Two-Year Workplan Executive Summary

Californians are concerned about the quality of their environment, and are vitally interested in ensuring that the generation and release of toxic and other hazardous substances is minimized. In response to this concern, the Legislature in 1998 augmented the State's hazardous waste source reduction program, located within the California Environmental Protection Agency's (Cal/EPA) Department of Toxic Substances Control (DTSC).[1] The Legislature also provided for DTSC to convene the California Source Reduction Advisory Committee (Advisory Committee) to help DTSC determine how to target pollution prevention (P2) resources. The Advisory Committee consists of ten public members representing diverse interests, and seven *ex officio* members from relevant Cal/EPA boards, departments, and offices. Through a collaborative fact-finding and decision-making process, DTSC developed this two-year workplan and evaluated source reduction progress in the State.

California Source Reduction Advisory Committee

Public Members:

- Robin Bedell-Waite, Chair, Contra Costa County Hazardous Materials
- Kelly Moran, Sierra Club
- Kacey Christie, National Steel and Shipbuilding Company
- David Arrieta, Western States Petroleum Association
- Jody Sparks, Toxics Assessment Group on behalf of California Environmental Rights Alliance
- Barbara Brenner, Breast Cancer Action
- Larry Moore, Larry's AutoWorks
- Dave Campbell, Paper, Allied Industrial, Chemical and Energy Workers International Union

Cal/EPA *ex officio* representatives:

- Lynn Baker, Air Resources Board
- Jeff Barnickol, State Water Resources Control Board
- Jeff Wong, Department of Toxic Substances Control
- Linda Mazur, Office of Environmental Health Hazard Assessment
- Nita Davidson, Department of Pesticide Regulation
- Judy Friedman, California Integrated Waste Management Board
- Nita Davidson, Department of Pesticide Regulation
- Judy Friedman, California Integrated Waste Management Board Management Board
- Alan C. Lloyd, Ph.D., Agency Secretary, California Environmental Protection Agency

Source reduction (also known as "pollution prevention," or P2) is defined in California statute as:

- any action that causes a net reduction in the generation of hazardous waste; or
- any action taken before the hazardous waste is generated that results in a lessening of the properties which cause it to be classified as a hazardous waste.

This report contains the two-year workplan required by SB 1916, as well as hazardous waste and environmental release data. Part I introduces the document.

[1] See Health & Safety Code section 25244.12 et. seq.; SB 1916 of 1998

The Two-Year Workplan

Part II contains DTSC's P2 workplan for fiscal years[2] 06/07 and 07/08, with a primary emphasis on the planned SB 1916 projects focusing on the Chemical Industry and the Marine Vessel Service and Repair. There is also an update of the ongoing activities planned for the Autobody and Paint Project, and various other DTSC program activities.

Marine Vessel Service and Repair

Many existing boatyard facilities were constructed prior to the availability and benefits of stormwater pollution prevention facility designs. Normal activities occurring at boatyard work areas include mechanical repairs, electrical repairs, woodworking, painting, aluminum work, steel work, gelcoat repairs, canvas and upholstery work. These activities generate sources of pollution that can potentially violate standards of air, stormwater and hazardous waste management requirements when "Best Management Practices" are not implemented.

DTSC's small business target industry project will provide technical assistance to businesses that are seeking to comply with environmental regulations and/or reduce wastes. In helping marine vessel service and repair facilities reach these goals, DTSC and both government and industry partners will reduce wastes, recycle hazardous materials, minimize pollution and, in many instances, increase company profits. This project shall enhance the State's ability to comply with California's Action Strategy and the Final Report to Governor Arnold Schwarzenegger. The report outlines initial actions that the State should pursue to maintain its nationally recognized leadership role in managing and protecting coastal and inland resources.

Chemical Industry Project

The Chemical Industry Challenge Project, in partnership with the Chemical Industry Council of California (CICC), is taking a different strategy from the typical statewide "one-program-fits-all" approach to pollution prevention. This project, developed in partnership with CICC, takes advantage of the facility specific waste eccentricities of the chemical industry, namely the uniquely different facility specific waste issues. It capitalizes on this increased potential of positive outcomes by addressing numerous individual waste reduction opportunities as opposed to one issue that affects a few facilities. The project is designed to reduce hazardous and other multimedia waste generation and releases at various individual chemical industry facilities. One of the incentives designed into the project is the recognition of successful waste reduction efforts. This recognition, based on predetermined criteria established jointly with CICC, will be made jointly by California State Government and CICC. The project will facilitate the sharing of these pollution prevention successes, accomplishments, problems, issues, etc. through an annual technical forum sponsored jointly by the Office of Pollution Prevention and Technology Development (OPPTD) and the CICC. The project is also designed to ultimately be sustained by the industry after OPPTD's involvement ends.

[2] California state government's fiscal years begin July 1st and end the following June 30th.

Auto Body and Paint Industry Project

Work on the Auto Body and Paint Project began in July 2004 and was designed to be a three year project. To identify practical P2 alternatives and develop best management practices (BMPs) for auto body and paint shop operations, OPPTD staff conducted extensive research via the internet and other available sources. A number of auto body and paint facilities were visited to observe their operations and to discuss with their owner and operators how P2 had been or could be implemented in their shops. Project staff met with and received valuable input from State and local regulatory agency representatives, industry training centers, from various product manufacturers and distributors, as well as representatives of the automotive paint industry and auto body industry trade associations. Advisory teams were assembled to include shop owner/operators that are industry leaders, air district inspectors, water quality inspectors, business assistance staff, paint and equipment vendors, trade association representatives, and industry training center staff. Meetings with the Advisory Teams were then held in the Sacramento, San Francisco Bay and Los Angeles areas to seek feedback on BMPs and P2 strategies being developed.

Fact sheets have been developed describing the P2 strategies and BMPs as part of a training package. The BMPs address the primary operations at auto body and paint facilities including, *Minimizing Paint Waste, Paint Spray Gun Cleaning, Solvent Recycling, Waste Water Management, Sanding Waste Management* and *Waterborne Coatings.* Additionally, a P2 self-assessment checklist and fact sheets providing guidance on hazardous waste classification and worker health and safety have been developed. The initial versions of these documents were uploaded onto the DTSC web site. Staff is working with a media contractor to produce a training video and to enhance program materials. The training package components, both the video and the BMP fact sheets will be field tested before being finalized. Training will be delivered through the CUPAs and other local government staff, industry training centers, trade associations, vendors, and other interested partners.

Other DTSC P2 Program Elements

DTSC's P2 program contains numerous other elements, including:

- Marketing and developing partnerships with private industry, conducting market research, and evaluating opportunities for future program direction, development, and expansion.
- Implementing the Hazardous Waste Source Reduction and Management Review Act ("SB 14") through the 2002 and 2006 Summary Progress Report (SPR) cycle preparation and implementation, review of SB 14 documents, and preparation of industry assessments.

- Performing industry assessments and P2 plan call-ins on the Pharmaceutical Manufacturing and Metal Fabricating industries.
- Integrating P2 into regulatory programs through inspections, enforcement, permitting, training, focused compliance, and Certified Unified Program Agency (CUPA) integration.
- Supporting local P2 programs including local P2 committees, Green Business Programs, P2 week, and others.
- Starting new local government P2 committees and partnering with the Western Regional Pollution Prevention Network (WRPPN).
- Funding research on alternatives to volatile organic compounds used as solvents in automotive aerosol cleaning products, consumer paint removers and strippers, and multi-purpose solvents for cleaning coating application equipment.
- California/Mexico P2 support.

These programs and expected outputs are described in Section 4 of Part II.

DTSC is also working on P2 technology projects, including:

- Non-chemical cooling water treatment methods;
- Life-cycle assessments of auto shredder residue and used oil management;
- Demonstration of high efficiency oil filters on State fleets; and

Hazardous Waste Trends, Source Reduction Progress, Current Status of Waste

Parts III and IV of this report provide an overview of hazardous waste data, and an evaluation of hazardous waste source reduction progress. DTSC looked at hazardous waste manifest and Biennial Report System data.

- Total hazardous waste generation, recurrent hazardous waste, and non-recurrent hazardous waste all continue to exhibit increasing trends. The total amount of hazardous waste manifested in 2004 was approximately 46% and greater than in 1996.

- Organic waste, excluding waste oil, constitutes a significant quantity of total hazardous waste manifested and continues to exhibit an overall upward trend. Organic waste may be an appropriate target for hazardous waste source reduction efforts.

- Generation of inorganic hazardous waste has been on an overall upward trend since 1996. Total manifested hazardous waste is trending upward after several years of decline in the early nineties; however, increases in quantities of site cleanup waste are primarily responsible for this steady upward trend.

- Waste oil remains the single-largest waste stream generated in California, and waste oil and oil contaminated waste together constitute over one third of all manifested waste in California. Waste oil from the transportation could be reduced to half the current volume by widespread use of high efficiency oil filtration systems and implementation of oil life extension programs.

- Recurrent hazardous waste generation normalized per Gross Domestic Product shows a 2.0% per year reduction from 1993 to 2003; 0.3% per year reduction when normalized per Durables; and 0.13% per year reduction when normalized per Manufacturing.

- The environmental services (hazardous waste treatment, storage, and disposal) industry, petroleum refining industry, and power generation industry remain among the largest volume generators. However, the universe of generators exhibits a tremendous diversity in type, and size of industries contributing to the overall hazardous waste generation picture.

- Recycling is the predominant management approach for hazardous waste in California (38%), followed by land disposal (22%), treatment (6%) and incineration (1%).

TRI analysis for California

Part V contains a brief analysis of data downloaded from the U.S. EPA's Toxics Release Inventory "TRI Explorer" web site. As in the previous data chapters, we looked both at trends and at "current status" (2003 data). We used two reports in this analysis. "Total Production-Related Waste Managed" is used to represent the total amount of TRI chemicals generated. "Release" reports were evaluated in order to see what releases might affect workers and communities. (Because reportable quantities and lists of chemicals have changed over time, TRI Explorer segregates the data into "core chemical" lists in order to compare like with like over time.)

Two things were seen in the trends analysis:

- "Total Production-Related Waste Managed," a TRI report category that we use to represent all TRI chemical generation, shows a steady decline in the original TRI reportable chemicals. However, most of the newer chemical lists show steadier production, with some core chemical lists (e.g., the 1995 list) trending upward after 1998.

- The TRI release report shows a more steady reduction in total TRI releases.

- An analysis of the total production-related waste data for year 2003 showed:

    - the chemical industry (SIC 28) contributed 33% of the total production-related waste managed generated in California;

  - Ammonia was the largest-quantity chemical, at 38%, for total production-related waste managed.

- 2003 releases data showed:
  - Not surprisingly, the offsite waste management industry released higher percentages of the TRI chemicals, including
    - 48% of the total Hazardous Air Pollutants (HAPs);
    - 70% of carcinogens; and
    - 79% of persistent, bioaccumulative and toxic (PBT) chemicals.
  - For PBTs, the #2 rank was SIC 33, primary metals, at 16%;
  - For HAPs, the #2 rank was plastics, at 30%;
  - For Carcinogens, the #2 rank was plastics, at 8.5%.

Part I:
Introduction

Californians place a high priority on the quality of their environment, and take an active interest in minimizing the generation and release of toxic and other hazardous substances. Pollution Prevention (P2) has emerged as a superior strategy to reduce the creation of pollution and the subsequent negative impacts of those pollutants. In 1998, the Legislature, in response to continuing concerns about pollution, augmented the State's hazardous waste P2[3] program, which is located within the California Environmental Protection Agency's (Cal/EPA), Department of Toxic Substances Control (DTSC).

This is the fourth workplan developed by DTSC under this legislation (SB 1916 of 1998). This workplan details the targets and activities for fiscal years 2006 through 2008 (FY06/08). In addition to information about planned P2 activities, this report contains information such as hazardous waste generation and environmental release data.

DTSC will be winding down the Vehicle Service and Repair Industry project prior to this plan period while continuing to work on the Auto Body and Paint (AB&P) Project. In addition, the Chemical Industry and Marine Vessel Service and Repair (MVSR) Industry were selected as the two new industries for P2 focus during the FY 06/08 cycle of SB 1916.

Each of these projects will address important P2 priorities, and promote implementation of source reduction measures as mandated by SB 1916. The Chemical Industry project is a voluntary program that addresses an industry primarily made up of large businesses and has been subject to a prior SB 14 call-in. The MVSR Program will be breaking new ground with both small and large business, and will complement ongoing efforts that have been established to prevent pollution of some of California's most sensitive environments along coastal and inland waterways.

As a result of the selection process for FY 06/08 projects and significant interest in DTSC and Cal/EPA in improving children's health, DTSC P2 staff researched potential pollution prevention projects in schools. U.S. EPA has developed a software tool, the "Healthy Schools Environments Assessment Tool" (Healthy SEAT) for institutionalizing a routine and broadly focused evaluation tool for school environments. DTSC's P2 program is working with U.S. EPA schools staff and state agencies to provide information to U.S. EPA that would allow customization of the tool for California. Such customization would add considerable value to the tool, could increase its use in California, enhance P2 opportunities, and could help state agencies in their work by bringing more schools staff to state program information.

[3] In this report, DTSC's program will be referred to as the "pollution prevention" (P2) program. Note that in DTSC's statute, it is called the hazardous waste "source reduction" program. Because "pollution prevention" is defined as "source reduction" in federal law and in common usage, and because "pollution prevention" has developed as the term of art in this field, "pollution prevention" will be used.

DTSC recognizes that, for our P2 efforts to bring meaningful changes in the industries we are working with, staff should make direct contact with industry and their representative associations. We will accomplish this through direct contact with businesses, conference attendance, speaking engagements, coordination with local agencies and other outreach opportunities.

Background

Pollution prevention (also known as "source reduction") is defined in California statute as:

- any action that causes a net reduction in the generation of hazardous waste; or
- any action taken before the hazardous waste is generated that results in a lessening of the properties which cause it to be classified as a hazardous waste.

As an overall environmental approach, P2 stresses the importance of maximizing resource use, creating little waste, and using the least-hazardous materials as possible. While traditional regulatory programs focus on restricting releases or properly managing wastes after they are produced, P2 focuses on the strategies that eliminate or reduce the creation of such wastes and pollutants. The collateral benefits to California business are clearly evident as well. Reductions in operating costs and environmental fees, worker safety improvements, elimination of long-term liability, improved environmental compliance and an enhanced image of environmental responsibility all contribute to a more sustainable business climate.

Pollution Prevention Strategies

- changing a production process in order to reduce or eliminate waste
- changing the nature of a product so that the use of toxic input materials is avoided
- improving purchasing practices
- inventory control and housekeeping to preclude the generation of off-specification and outdated chemicals

Pollution Prevention Benefits

- reduced costs to businesses
- reduced need for regulatory oversight
- reduced need for waste management and landfill capacity
- reduced worker exposure to hazardous waste and toxic materials
- reduced community and consumer exposure to toxic chemicals

DTSC's Pollution Prevention Program

DTSC has operated its P2 program since 1985. Efforts to promote hazardous waste source reduction include:

- implementing the Hazardous Waste Source Reduction and Management Review Act (commonly known as "SB 14"). This program requires that hazardous waste generators identify processes that generate hazardous waste, consider alternatives that would reduce or eliminate waste generation, select appropriate source reduction strategies for implementation, and establish a timeline to implement these strategies. Facilities subject to SB 14 also must report their source reduction and hazardous waste management progress over time;
- providing support and resources to local government P2 programs;
- conducting research into P2 alternatives;

- developing printed P2 material for use by hazardous waste generators,
- training both industry and regulatory agency staff on P2;
- integrating P2 into regulatory programs at the State and local levels;
- supporting the Advisory Committee, which consists of ten public members and the executive officers of DTSC, Air Resources Board, State Water Resources Control Board, Integrated Waste Management Board, Office of Health Hazard Assessment , and the Office of the Secretary (Cal/EPA) as *ex officio* members;
- preparing a P2 workplan that includes a summary analysis of hazardous waste generation and management patterns by Standard Industrial Classification (SIC Code, waste stream and type of management method, and an outline of proposed P2 activities for the next two years; and
- developing and implementing a voluntary P2 program.

The enactment of SB 1916 and the establishment of the Advisory Committee represented a continuing effort in California to protect public health and the environment through pollution prevention. This document provides details on upcoming activities and expected accomplishments.

Part II:
DTSC Two-Year Pollution Prevention Workplan (2006-2008)

Overview

This document represents the workplan for the Department of Toxic Substances Control's (DTSC) pollution prevention (P2) program for fiscal years 2006/2008. The mission and objectives for the program are presented immediately below. This is followed by sections containing summaries of the major focus areas and activities that will be pursued this year.

Mission

The mission of DTSC's P2 program is to promote pollution prevention by providing State leadership, guidance, and assistance to industry, local government, communities and other environmental agencies.

Although DTSC's statutory directive is clearly based in California's hazardous waste control law, DTSC's P2 program considers its mission as broader than just reducing amounts of hazardous waste generated. Such an approach would focus exclusively on businesses that generate very large quantities of hazardous waste. In order to protect public health, the environment, and workers, and to prevent media transfer of pollutants, DTSC's P2 program includes activities related to small quantity generators, specific chemicals, and interagency cooperation. Full implementation of pollution prevention represents a significant cultural change and philosophical shift in the historic way of doing business, both in the private sector and in government, and requires an approach that is broad and sustained.

Pollution Prevention Program Objectives

- Establish effective networks for communicating, promoting and distributing pollution prevention information
- Promote and provide support to local pollution prevention programs
- Achieve measurable reductions in the generation of hazardous waste and/or the hazardous properties of waste produced in California through source reduction
- Ensure that inspectors and permit staff at both the state and local levels promote pollution prevention during routine regulatory activities
- Expand current hazardous waste pollution prevention efforts to include other environmental regulatory agencies, so as to achieve better overall environmental results and minimize the unwanted shift of pollutants between environmental media
- Achieve recognition as a resource for P2 information

Note that the laws and regulations establishing the P2 program within DTSC do not grant the authority to mandate or enforce prevention. Even the Hazardous Waste Source Reduction and Management Review Act of 1989 (commonly known as "SB 14"), which requires that large generators of hazardous waste plan to reduce hazardous

waste generation, contains clear limitations on DTSC's enforcement authorities. DTSC does not have the authority to control the decisions made by businesses as to whether or not to implement specific P2 strategies. The ultimate decision to implement source reduction resides instead with individual generators, which each face a unique set of environmental, economic and technical constraints. DTSC believes that through leadership, guidance, assistance, and the integration of pollution prevention into other aspects of its regulatory program, California will ultimately achieve significant reductions in the quantity and/or toxicity of hazardous waste generated.

DTSC selected the Chemical Industry Project and the Marine Vessel Service and Repair Industry Project in consultation with the Advisory Committee. The selection process included extensive internal research, review and analysis, as well as external discussions. The process started with a long list of potential targets that were reduced to a short list by systematically applying a set of selection criteria in an iterative manner. The final decision was made based on these criteria, informed by the input of advisory committee members and other stakeholders, and with due consideration of the capabilities and priorities of DTSC/OPPTD. The criteria that DTSC used to guide the selection process are summarized below:

ORGANIZATIONAL INTEREST
* Governor's priorities
- Cal/EPA
- DTSC/other Cal/EPA Boards, Departments, and Offices
- U.S. Environmental Protection Agency
- Advisory Committee
- Local Government (CUPA, Green Business)

ENVIRONMENTAL/PUBLIC HEALTH THREAT
* Problem exists/is growing
- Multimedia
- Community/Public Interest (Environmental Justice)

CHEMICAL OR INDUSTRY FOCUS
- Hazardous Waste Reduction Potential
- Solutions/Best Management Practices (BMP's) available
* Implementation Potential (Voluntary projects, do-ability)
- Regulatory Driver
- Tech Feasibility
- Economics

DTSC P2 CAPABILITIES
- Prior Work/SB 14 Plans Review
- Staff expertise
- Staff availability
* Measurable results

* Priority criteria in that category

Section 1: Marine Vessel Service and Repair (MVSR) Fiscal Years (2006-2008)

Background

The Department of Toxic Substances Control's (DTSC), Office of Pollution Prevention and Technology Development (OPPTD) proposes to establish a technical assistance and outreach project to implement Pollution Prevention (P2) Best Management Practices (BMP) for the reduction or elimination of hazardous waste in the boatyard and marina environment. Under the SB 1916 guidelines, marine vessel maintenance operations will be the focus of a two-year (2006-2008) project. DTSC and partners will determine the most effective BMP and P2 alternatives to promote for implementation. DTSC will share BMP's with Certified Unified Program Agencies (CUPA's), environmental and marina organizations, and local, regional, State, and federal agencies. This project will seek to expand P2 outreach to marine vessel service and repair facilities through liaisons with existing industry associations and local and regional government organizations, i.e., the Clean Marinas California Program, Department of Boating and Waterways, and the Certified Unified Program Agencies (CUPA), that currently provide regulatory and informational assistance for commercial and recreational boating activities within the State.

Project Goal

The goal of the Marine Vessel Service and Repair (MVSR) Program is to reduce environmental and human health impacts of vessel service, maintenance and repair operations within California by changing the behaviors and practices of the industry to those that promote:

- Increased awareness of pollution prevention techniques;
- Increased compliance with existing environmental laws and regulations;
- A commitment to protect public health and the environment; and
- Identification and support of specific needs of both the marine vessel service and repair industries through partnering and utilization of the many organizations that are unique in the technical and industry support they provide for these individual groups.

Project Description

DTSC will accomplish the project goal through the implementation of the following program element:

- Development and distribution of industry specific P2 technical resources for implementing within existing programs that operates at both the regional and statewide levels. A two-tiered focus will be on marine repair processes that occur exclusively at boatyard facilities and marinas that offer boatyard repair services, and secondly, project goals for marinas.

- Development of a stand-alone training program for use by owners of individual boatyards, marinas with onsite repair services, or industry associations and business assistance organizations that provide training for these facilities.

- Development and distribution of multi-lingual P2 resources to assist cross-agency, border, and environmental justice programs.

- Statewide distribution of P2 resources to CUPA programs by presenting to and participating in statewide and regional Cal-CUPA conferences and quarterly regional P2 committee meetings.

- Identification of local and State funding resources available to eligible marine vessel service and repair facilities that seek financial assistance in implementing specific P2 technologies.

- Project design development that supports exit strategy goals that will facilitate the adoption and continuance of P2 technical and outreach resources for government and private entities who provide industry support to the marine service industry.

General Time Line - The initial commitment is for a two-year project that will commence on July 1, 2006 and continue through June 30, 2008. Prior to the conclusion of fiscal year 2007/2008, DTSC, in consultation with the Advisory Committee, will determine whether additional elements to the project are needed that would require an extension of the timeframe.

Industry Description

Standard Industrial Classification (SIC) Code, and numbers of facilities; SIC code 3732 (ship building and repairing), SIC code 4493 (marinas). Throughout California, there are approximately 4,100 boatyard service and repair facilities, generally in the form of dealerships and boat repair facilities, and 516 marinas.

Boatyards are industrial marine facilities that haul boats and marine vessels onto dry land for purposes of repair and maintenance. Boatyards usually provide services for pleasure and smaller commercial vessels in the under 40-foot category. These services

include routine maintenance and engine repairs and the washing, sanding, and painting of vessel hulls. Some boatyards reserve sections of their property for do-it-yourself repairs. Boatyards are industrial operations that generate hazardous wastes: e.g., waste oil, anti-fouling paint waste, volatile organic compounds (VOC), solvents, and metal contaminated sludge and solid waste. These operations may be regulated by National Pollutant Discharge Elimination System (NPDES) permits issued through the Regional Water Quality Control Boards (RWQCBs). Boatyards must obtain a U.S. EPA identification number and comply with hazardous waste management and disposal requirements as specified by DTSC, county environmental health agencies, and/or local fire departments. Regional Air Quality Management Districts regulate certain painting and/or sanding operations.

Marinas on the other hand, are basins with slips available to rent to boaters who keep their vessels in the water. Usually, marinas offer services for their tenants such as secured facilities, utilities, restrooms and showers, and parking. Some marinas also contain convenience and supply stores and restaurants. Many marinas have fuel docks, pump out facilities, and launch ramps. Very few marinas, less than ten percent, also contain boatyards which are subject to Industrial Storm Water Permits.

Environmental Concerns

The services provided by marine vessel service and repair facilities include general vessel repair and maintenance and/or refueling services. Typical hazardous wastes generated by the MVSR are:

- used oil
- oil and fuel filters
- lead acid batteries
- waste fuels
- waste solvents
- waste paint and sanding wastes containing heavy metals
- contaminated absorbent and shop rags
- water contaminated with oils, fuel, grease, solvents, paints and heavy metals
- waste adhesives and finishers

MVSR facilities can release solvents, oils, battery acid, and metals to the environment through the air, ground, sewer, and storm water drains. Activities that may cause environmental releases include improper management of spills, sanding and painting operations, storm water runoff, and the use of petroleum-based and chlorinated cleaning solvents. Poor shop practices and lack of training on hazardous materials handling and management may be the underlying cause of many of these releases. In comparison to similar types of industries, such as Vehicle Service and Repair (VSR), marine service facilities are not as heavily regulated, and they do not have the environmental resources, e.g., fact sheets, training materials, etc., that are available to other industries. This creates a significant potential for harmful releases in this industry, especially due to its close proximity to environmentally sensitive coastal and inland

water areas. There are opportunities to affect positive changes by a large number of operators by the implementation of P2 methods.

Major Tasks - During fiscal years 2006-2008

Task 1 - Assemble statewide and regional advisory teams.

The advisory team will consist of both industry and government partners that consist of:

- Boating industry organizations,
- California Clean Boating Network (CCBN)
- Participating agencies,
- Departments and/or Boards,
- Advisory Committee members,
- CUPAs,
- Regional P2 Committees, and/or
- Interested parties – DTSC has received inquiries from the State of Arizona to coordinate on marina projects along the Colorado River.

Task 2 - Information development.

1. Conduct a needs assessment of the industry to prioritize needs of the boatyard owners and managers for resource development and P2 implementation. This will be accomplished with either personal discussions and/or surveys of industry association members and both government and non-government service providers to the industry.

2. Modify and update existing DTSC documents to reflect boatyard activities. These documents include auto repair fact sheets, auto body and paint fact sheets, auto repair checklists, and auto repair waste assessment handbooks. The update and redevelopment of these documents will target P2 options that focus on:

   - Shop Cleanup Management
     - Inventory controls
     - Spill containment techniques (dry shops)
     - Secondary containment
     - Employee training

   - Parts Cleaning Options
     - Use of aqueous cleaning solutions
     - Cost savings and economic benefits
     - Solvent alternatives
     - Parts washing
     - Cleaning efficiency and equipment operation

- Maintenance Practices
  - Waste stream segregation
  - Oil and fuel filter management
  - Recycling and contract services for recyclable wastes
  - Lead-acid battery management
  - Oil life extension programs
  - Sanding, surface preparation, and painting
  - Anti-fouling paint alternatives
  - Vessel washing
  - Aluminum and metal fabrications

3. Develop a matrix that outlines the regulatory and economic benefits of a shop that utilizes various waste minimization options versus activities that do not incorporate P2. The matrix design will be short, easily understandable, and compact enough to fit on each side of a service clipboard. Multi-language material may be required depending upon the target audience.

4. Develop and streamline a customer friendly online database of equipment vendors and contacts to assist business owners in obtaining relevant P2 information. DTSC will:

   - Utilize existing vendor lists from government and regional databases, and

   - Conduct calls to vendors if sufficient resources are not available from other agencies.

5. Research and develop marina specific materials that support the following P2 projects:

   (a) Funding Resources - Development of fact sheets identifying funding and grant opportunities that are provided by various agencies and that are available to eligible marina owners and operators. These fact sheets would address the types of grants available, project details (i.e., hazardous waste collection facilities), application information, dates and deadlines, etc.

   (b) Bilge Pads - Identification of manufacturers of reusable and/or recyclable bilge pads. DTSC will partner with the California Integrated Waste Management Board (CIWMB) to assist with the implementation of these technologies at a certain number of marinas, and to measure effectiveness of the program with the assistance of marinas, local governments, and manufacturers.

Task 3 **-** Training development.

- Evaluation of available training materials. DTSC will evaluate training materials developed by out-of-state programs, the U.S. EPA, and California's RWQCBs, Department of Boating and Waterways, and Clean and Green Marina Programs.

- Development of training packets or modules that target activity specific processes for "boatyards" and "marinas".

- Whenever possible, development of updated training resources in multimedia format that includes power point and video formats.

- Whenever necessary, development of video productions of P2 alternatives and the associated economic benefits of implementing a P2 program. DTSC may establish a contract with a production studio for this task.

- Development of a training plan that identifies venues for reaching target audiences through active participation and "train the trainer" type presentations.

Task 4 - Partnerships with government/businesses.

DTSC will solicit assistance from government and business partners as a continual process throughout the planning, development, and implementation processes.

- Conduct stakeholders' meeting to assess and prioritize needs for government and business sectors.
- Coordinate with Border States that have developed Clean and Green Marina Programs.
- Develop relationship with local Chamber of Commerce Associations to facilitate outreach to multicultural target audiences.
- Assist local green businesses programs towards implementing the boatyard maintenance industry as a part of their program.
- Contact trade associations for outreach distribution of information to businesses.

Task 5 – Marketing and promotion of MVSR program products.

DTSC will participate at events and workshops scheduled at the following venues to distribute all outreach materials developed for organizations providing business assistance activities for boatyard repair and marina facilities.

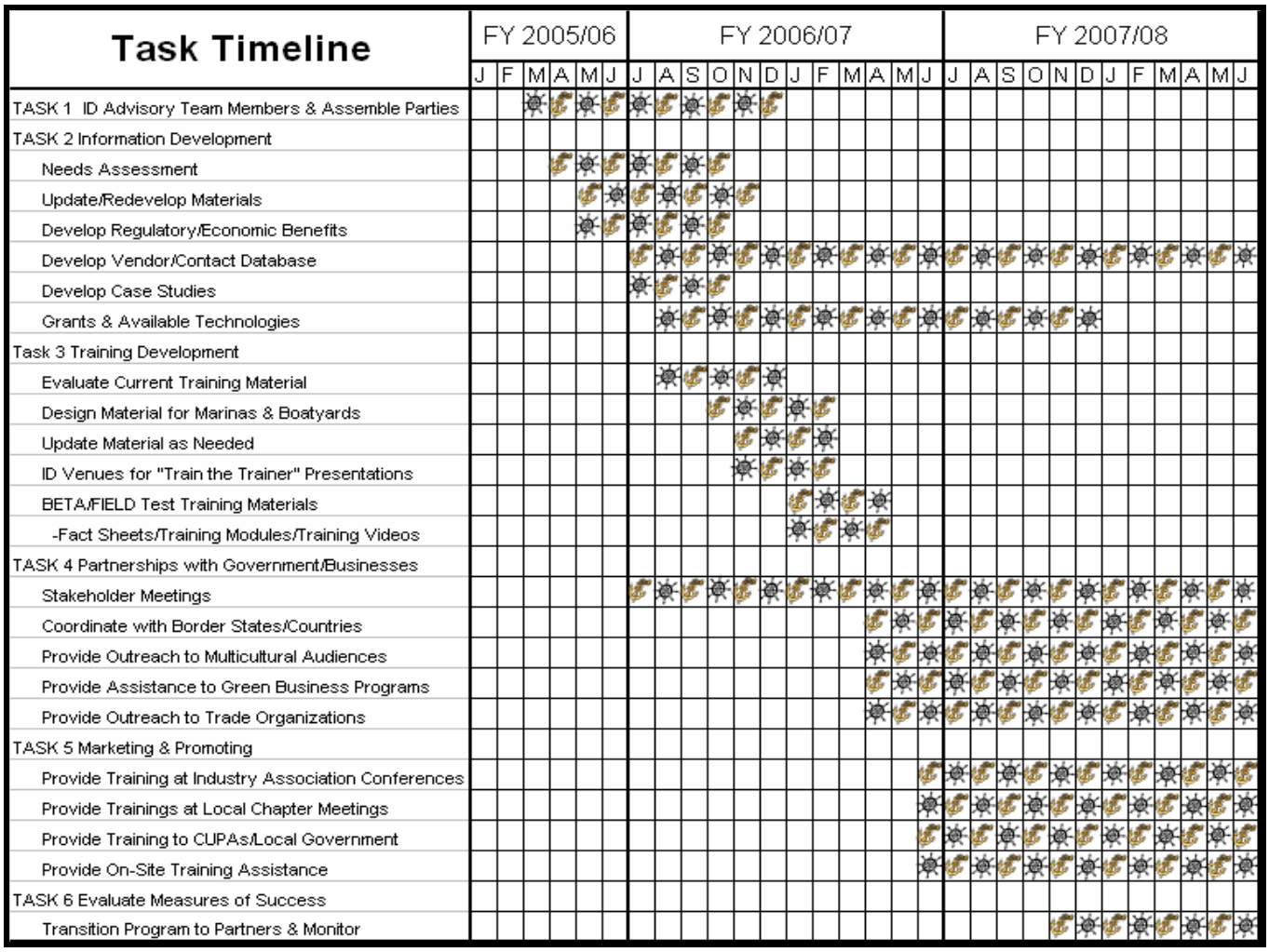
- Industry association conferences (statewide and regional)
- Local chapter association meetings
- Vendor fairs
- "On location" assistance to businesses and local agencies
- Regional green business or business assistance workshops

Task 6 – Evaluate Measures of Success.

Solicit public agencies that are willing to do pilot training and implementation outreach strategies to establish baseline data and to measure compliance trends over a period of time with the boatyard maintenance facilities.

In conjunction with an industry partner, identify and evaluate prospective pilot project targeted for development into a case study or measurable findings report that would facilitate P2 implementation at boatyard maintenance operations. The project may involve working with a large harbor transportation provider, possibly a water taxi, or harbor vessel businesses. This could be a voluntary project with a single fleet operator or port facility.

Table 1: Schedule for Marine Vessel Service and Repair (MVSR) Project



Section 2: Chemical Industry Project Workplan

Background

The Chemical Industry Pollution Prevention Project will challenge individual chemical facilities to reduce multimedia waste generation. This draft workplan has been developed in consultation with the Chemical Industry Council of California. This P2 project model takes advantage of the uniquely different facility specific waste issues across the chemical industry. By addressing numerous individual waste reduction opportunities, this project capitalizes on the increased potential for a wide variety of positive outcomes. Both the environment and industry benefit from waste reduction achieved through this exciting partnership.

Project Goals

- By July 1, 2006, establish and roll out a challenge program in partnership with the Chemical Industry Council of California (CICC) and its member facilities.
- to reduce hazardous and other multimedia waste generation and releases, and to otherwise implement pollution prevention measures, to a level or in a manner that meets predetermined criteria for recognition by the State of California.
- recognize accomplishments jointly with the CICC
- share successes, accomplishments, problems, issues, etc with the Chemical Industry through an annual industry technical forum sponsored jointly by OPPTD and the CICC.
- present a new pollution prevention project model. This model is expected to accomplish positive outcomes and results through a series of individual projects for an industry where a statewide one size fits all project is not effective
- develop and establish partnerships with this important industry segment

Objectives

- Achieve waste reduction through a pollution prevention partnership with the chemical industry.
- Capitalize on the chemical industry's interest and responsiveness to government recognition of achievement.
- Share the individual facility, waste reduction stories and best practices with all members of the industry in California.
- Maintain momentum with industry by moving ahead on project development immediately, in partnership with industry representatives.

- Involve stakeholders in the development and implementation of the project.
- Make project sustainable by industry after OPPTD's involvement ends.

Description of Project

The project would include challenging individual chemical industry facilities to reduce hazardous waste generation and other multi-media releases, and recognizing those facilities that would meet agreed upon recognition criteria. It capitalizes on the increased potential of positive outcomes by addressing numerous individual waste reduction opportunities as opposed to one issue that affects a few facilities.

- Major Components
  - Planning and project development with stakeholders
  - Application, participation, review, and recognition process
  - Project outcome dissemination

- Overview of Tasks
  - Planning and project development with stakeholders
    - Delineate project directions together with Chemical Industry Council of California.
    - Establish advisory team
    - Develop recognition criteria
  - Application, participation, review, and recognition process
    - Develop participation process
    - Set up review process
    - Identify measures of project success
    - Recognize facilities meeting predetermined criteria
  - Project dissemination
    - Promote project opportunity to Industry
    - Publicize project accomplishments
    - Share success stories and lessons learned in a technical forum

- Expected Outcomes
  - Establishment of a strong partnership with the industry
  - Participation of CICC member facilities in the challenge program
  - Achievement of significant environmental benefits through reduction of hazardous wastes or other multi-media releases
  - Recognition of facilities for their exemplary pollution prevention practices
  - Sharing of successes, accomplishments, and lessons learned from the project. This would include holding a technical forum, or preparing case studies.
  - Identification of best management practices

- Exit Strategy
  Design the project for the highest probability of Industry adopting the concept as its own and to continue with the project beyond the State's involvement.

Description of Industry

The chemical industry is a significant actor in California's well-being, in terms of both economic and environmental impacts. According to the American Chemistry Council, the California chemical industry contributes $16,962 million to the gross state product and produces $26,925 million worth of goods (ranked 7th in the State).[4] In 2004, there were 1,206 chemical manufacturing facilities in California, employing 90,970 people.[5] This multifaceted industry produces a wide range of products and is characterized by a variety of SIC codes (28xx) grouped under eight headings. The industry includes not only the general SIC categories of Industrial Inorganic Chemicals (281), Industrial Organic Chemical (286), and Miscellaneous Chemical Products (289), but also the specialty products of: Plastics and Synthetic Resins (282); Drugs; Soap, Detergents, and Cleaning Preparations (283); Paints, Varnishes, Lacquers, Enamels and Allied Products (285); and Agricultural Chemicals (287). The numbers of manufacturing establishments and employment are distributed among the major chemical industry sectors as follows:

Table 2: Chemical Manufacturers and Employment by Manufacturing Sector

SIC Code	Sector Description	Mfg Establish-ments	Employment
281	Industrial Inorganic Chemicals	131	3,559
282	Plastics and Synthetic Resins	88	4,822
283	Drugs	243	47,059
284	Soap, Detergents, and Cleaning Preparations	260	12,893
285	Paints, Varnishes, Lacquers, and Enamels	127	5,933
286	Industrial Organic Chemicals	36	1,211
287	Agricultural Chemicals	79	2,666
289	Miscellaneous Chemical Products	242	12,647

At the same time, the California chemical industry ranks 1st in hazardous waste quantities and 5th in total hazardous releases, as reported by the federal Toxics Release Inventory (TRI).[6] Major waste-generating processes include cleaning

4 American Chemistry Council, 2005
http://www.americanchemistry.com/s_acc/sec_article_getinvolved.asp?CID=384&DID=1290
5 2004 California Manufacturers Register, Harris Infosource, 2004
6 Toxics Release Inventory (TRI) Explorer, U.S. Environmental Protection Agency http://www.epa.gov/cgi-bin/tri.getcounties?report=industryquantity&scriptname=industry&state=STATE&c_year=2003&c_industry=&c_chemical=_

activities (washing out reactor vessels and other production equipment, bottles and glassware, containers and tanks, and flushing lines); plant wash-down; generation of off-specification materials and by-products; and distillation and reclamation activities. The industry's air emissions, point source and fugitive, account for 95 percent of the industry's total onsite disposal and other releases, and 75 percent of the industry's total on- and off-site releases. In terms of fugitive air emissions, which exceed half of total air emissions, the chemical industry ranks first in the State.

TRI data provide mapping of release patterns by State and by industry. [7] The highest concentrations of TRI releases are in southern California, particularly in Los Angeles, Orange, and Riverside counties, and around the Bay Area and the northern Central Valley, particularly Contra Costa, Alameda, San Joaquin, and Sacramento counties.

The distribution of hazardous waste generated, by 3-digit SIC Code, is shown by the following table based on 2004 Department of Toxic Substances Control (DTSC) manifest data.

Table 3: Chemical Industry Waste Generation By Manufacturing Sector

SIC Code	Sector Description	Tons
281	Industrial Inorganic Chemicals	7,779
282	Plastics Materials and Synthetic Resins	7,789
283	Drugs	25,201
284	Soap, Detergents, and Cleaning Preparations	5,074
285	Paints, Varnishes, Lacquers, Enamels and Allied Products	1,550
286	Industrial Organic Chemicals	25,871
287	Agricultural Chemicals	7,931
289	Miscellaneous Chemical Products	6,964
Total		***88,159***

ALL_&c_chemlist=&c_coreyear=&c_indlist=&c_usrState=&c_fips=00000&c_tabrpt=3&c_zip=&c_chk0=true&c_chk1=true&c_chk2=true&c_chk3=true&c_chk4=true&c_chk5=true&c_chk6=true&c_chk7=true&c_chk8=true&c_chk9=true&c_chk10=true

7 http://www.epa.gov/cgi-bin/broker?view=STCO&trilib=TRIQ0&sort=_VIEW_&sort_fmt=1&state=06&county=All+counties&chemical=_ALL_&industry=28&year=2002&tab_rpt=1&fld=RE_TOLBY&mapit=1&_service=oiaa&_program=xp_tri.sasmacr.tristart.macro

Major waste streams generated by the California chemical industry (sometimes grouped with similar waste streams) in 2004 were as follows:

Table 4: Chemical Industry Major Waste Stream Generation

CWC	Description	Tons
181	Other inorganic solid waste	26,618
212, 213, 214	Oxygenated, hydrocarbon, and unspecified solvents	11,482
131, 132, 133, 134, 135	Inorganic aqueous solutions	11,239
511, 512, 513	Empty containers	4,029
352	Other organic solids	4,025
271, 272	Resins (monomers and polymers)	3,187
341, 342, 343	Organic liquids	2,299
792	Liquids with pH less than or equal to 2 with metals	2,014
331	Off-specification, aged, or surplus organics	1,769

[According to 2002 industry reports, CWC 181 ("other inorganic solid waste") included plant sweepings, catalyst fines, refractory brick, fly ash, metal-contaminated debris, scrap steel, scrap lead oxide, raw material packaging filter cake, etc. CWC 352 ("other organic solids") included contaminated hoses, oily debris, cosmetic precursors, resin-contaminated debris, solidified resin, filter bags, oily absorbent, tar waste, etc.]

California Air Resources Board (ARB) 2002 data indicated that the various SIC codes of the chemical industry produced about 4,600,000 pounds of toxic air emissions.[8] We grouped the data into the same 3-digit SIC codes as done above with hazardous waste manifest data.

Table 5: Toxic Air Emissions By Manufacturing Sector

SIC Code	Sector Description	Pounds
281	Industrial Inorganic Chemicals	2,176,593
282	Plastics Materials and Synthetic Resins	334,608
283	Drugs	448,079
284	Soap, Detergents, and Cleaning Preparations	65,133
285	Paints, Varnishes, Lacquers, Enamels and Allied, Products	722,084
286	Industrial Organic Chemicals	118,792
287	Agricultural Chemicals	136,003
289	Miscellaneous Chemical Products	625,165
Total		4,626,461

8 Extracted from the ARB Almanac Database, 2002 reporting year, as provided by Chris Nguyen, California Air Resources Board, March 29, 2005

Some of the major chemicals released as toxic air emissions (in quantities of 1,000 pounds or greater) included the following.[9]

Table 6: Major Chemicals Released by Chemical Industry As Toxic Air Emissions

Chemical	Total Pounds
Ammonia	1,473,374
hydrogen sulfide	758,386
1,1,1-TCA	396,056
Methanol	275,943
Perchloroethylene	191,555
xylenes, mixed	186,649
isopropyl alcohol	179,901
Toluene	174,630
Styrene	164,751
methylene chloride	162,829
Fluorocarbons (chlorinated)	73,623
hydrochloric acid	68,524
CFC-113	62,768
Trichlorofluoromethane {Freon 11}	61,255
crystalline silica	48,120
Glycol ethers (and their acetates)	36,614
mineral oils	31,309
Freon 12	25,150
propylene glycol	15,729
hydrogen fluoride	12,025
MEK	11,200
methyl bromide	10,521
1,4-dioxane	10,142
vinyl acetate	9,867
hydrocyanic acid	8,111
propylene oxide	7,296
methyl methacrylate	7,164
epoxy resins	7,041
Hexane	6,956
1,3-butadiene	6,857
Formaldehyde	6,565
Phenol	5,616
phthalic anhydride	5,216
Chlorine	4,870
dipropylene glycol monomethyl ether	4,462
ethylene glycol	4,154
Lead	4,153
n-butyl alcohol	4,050
sulfuric acid	3,953

9 ARB Almanac database, 2002 reporting year

Chemical	Total Pounds
Naphthalene	3,670
Ethylene glycol monobutyl ether	3,495
maleic anhydride	3,411
carbon tetrachloride	3,026
Trichloroethylene	2,963
vinyl chloride	2,475
Nickel	2,365
Propylene glycol monomethyl ether acetate	2,140
Propylene	2,026
Acetaldehyde	1,877
1,2,4-trimethylbenzene	1,775
Isocyanates	1,699
allyl alcohol	1,512
Chloropicrin	1,493
Zinc	1,461
Chlorobenzene	1,273
Benzene	1,228
Freon 22	1,123
Chloroform	1,089
ethyl benzene	1,060

Pollution prevention opportunities may include a variety of more efficient cleaning processes to reduce the large volume of waste waters generated by the chemical industry, and better process or facility design to reduce the high level of both point source and fugitive air emissions.

Major Tasks

- Build A Strong Working Relationship With Industry
  - Delineate project directions with CICC
  - Agree on a process for targeting industry wastes/emissions
  - Identify significant wastes/releases of concern for initial target/discussion purposes
  - Identify target universe
  - For each participating facility, identify individual facility's needs for pollution prevention
  - Obtain agreement with participating facility on target waste stream
  - Identify baseline on target waste

- Establish Advisory Team
  - Members would include representatives of the chemical industry, OPPTD, and Advisory Committee
  - Define role of team.

- Develop Criteria for Recognition
  - Coordinate with Advisory Team to develop criteria
  - Consider best ways to measure achievement:
    - By direct waste reduction percentage
    - By effect of large business/small business mentoring partnership or even team project
    - Recognize: effort; results; assistance.

- Measurement Means/Tools for P2 Efforts
  - Develop tools for measuring waste generation or releases to determine baseline and level of reduction.
  - Identify measures of project success
    - Number of facilities participating?
    - Number of facilities recognized?
    - Amount of wastes reduced?
    - Percent of wastes reduced?

- Marketing/Recognition
  - Decide on a process on how to promote the challenge industry-wide to reach at least 80 percent of target universe pursuant to the provisions of Health and Safety Code section 25244.17.1(b)(4). Options include:
    - Mass mailing
    - Presentation/introduction of challenge program at industry association meetings or conventions
    - Invitation of facilities to a promotional meeting
    - Phone contacts
  - Decide on who will issue recognition in partnership with CICC
    - DTSC?
    - Cal/ EPA?
    - Governor's Office?
    - Form a review committee for awarding recognitions
    - Members could include representatives from
      - Industry
      - DTSC
      - Cal/EPA
  - Determine how to verify company pollution prevention results

- Publicizing recognized facilities
  - Press release
  - Media event
  - Case studies
  - Web-based best management practices

- Technical Forums
  - Hold technical forum to share successes, problems, and issues encountered in project implementation

- Exit Strategy
  - The probability of this project being adopted by Chemical Industry beyond the involvement of the State will depend in large part on the success of building of a strong partnership with Industry. It will also depend on the business and environmental values that accrues to Industry as a result of the projects' development and implementation.

- Technical Support
  - Develop "resources folder" for participating facilities, to include:
    - Descriptions of environmentally-related management systems
    - Case studies
    - Best Management Practices guidance
    - Technical P2 information
    - Compliance information
    - Relevant government agencies and contacts

- Project Assessment
  - Develop tools for measuring reduction.
    - How should we measure generation of hazardous waste or releases of hazardous substances?
    - How should we normalize (waste quantity per unit production)
  - Determine if expected outcomes had been accomplished. As listed before, expected outcomes include:
    - Establishment of a good working relationship with the industry
    - Participation of CICC member facilities in the challenge program
    - Achievement of significant environmental benefits through reduction of hazardous wastes or other multi-media releases
    - Recognition of several facilities for their exemplary pollution prevention practices
    - Sharing of successes, accomplishments, and lessons learned from the project. This would include holding a technical forum, or preparing case studies.
    - Identification of best management practices

Table 7: Milestones for Chemical Industry Project

Major Tasks	Projected Start Date		Projected Completion Date	
Develop project with CICC	Jan. 2006		July 2006	
Identify project target universe	Feb. 2006		July 2006	
Establish advisory team	February 2006		April 2006	
Develop criteria for recognition	January 2006		July 2006	
Develop project measurement tools	May 2006		July 2006	
Issue challenge	July 2006		December 2007	
Assist participants	July 2006		Continuing until end of project	
Form review committee	April 2007	Jan. 2008	June 2007	Feb 2008
Select facilities for recognition	June 2007	Mar 2008	June 2007	Mar 2008
Organize recognition event	May 2007	Mar 2008	Aug. 2007	May 2008
Hold technical forum	Aug 2007	June 2008	Aug 2007	June 2008
Turn over project to industry	April 2008		June 2008	

Table 8: Chemical Industry Project Timeline Chart

Task Description	FY 2005/2006						FY 2006/2007												FY 2007/2008											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Project Development with Industry																														
Delineate project directions with CICC																														
Identify target facility universe																														
Identify facilities' needs for P2																														
Agree on target waste stream or releases																														
Establish Advisory Team																														
Criteria Development																														
Develop criteria																														
Measurement Tools																														
Develop measurement tools to determine waste generation or releases																														
Application, Review, and Recognition Process																														
Promote challenge project																														
Develop and provide resources folder for participants																														
Form review committee																														
Select facilities for recognition																														
Project Dissemination																														
Prepare case studies																														
Organize recognition event																														
Hold technical forum																														
Project Assessment																														
Prepare project report summary																														
Post project summary in DTSC website																														
Exit Strategy																														
Develop exit strategy																														
Transfer project to industry																														

Section 3: Auto Body and Paint Industry Project Workplan Update

Work on the Auto Body and Paint (AB&P) P2 project started in July 2004. Significant progress has been made in identifying best management practices and pollution prevention strategies, preparing informational materials, and developing relationships with key project stakeholders. DTSC is currently working with a media consultant to produce training media and help with finalizing other program materials. We anticipate that program materials will be ready for promotion and release by early 2006.

Background

There are approximately 8000 AB&P shops in California (infoUSA.com) Many of these shops do body work and refinishing, and produce repairs that are near factory-finish quality with life-time guarantees. The kind of work includes frame repair, sanding, panel replacement, surface preparation, and primer and coating application. Coating application ranges from painting one car panel to complete paint jobs.

Environmental Concerns

The most common hazardous waste generated at these shops is spent solvents mixed with paint waste. Used oil and antifreeze, lead-acid batteries, sanding dust and solvent recycler still bottoms are also generated in smaller quantities. Spent paint booth filters are sometimes managed as hazardous waste; however, many shops have determined that their used booth filters are non-hazardous. Some dusts generated from sanding operations are hazardous waste because they have been found to contain metals above California regulatory thresholds. Many shop owners and inspectors are unaware that their sanding dusts may be hazardous waste.

Air emissions from paint application and paint gun cleaning present the greatest concerns. California's air districts have rules specifying the type of spray equipment that can be used and the amount of volatile organic compounds (VOCs) allowable in automotive refinishing coatings. Air districts also have rules for paint gun cleaning. Some air districts require the use of enclosed gun washers and/or specify the amount of VOCs allowable in gun cleaning solvents.

Wastewater and storm water discharges also present environmental concerns. Heavy metals from sanding operations, spilled or drained vehicle fluids, paints and solvents, and soaps from car washing all have the potential to contaminate surface waters and groundwater.

COMPLETED TASKS

Identify P2 Strategies and Best Management Practices

To increase our knowledge about shop operations, identify problem areas, and learn about practical solutions to common problems, the project team conducted extensive web and product research; met with California Air Resources Board (CARB) representatives, CUPA and other local agency inspectors, service providers, product distributors, and

representatives of the automotive paint industry and auto body industry trade associations; and visited 12 auto body and paint shops and three training centers. As a result, the following P2 strategies and best management practices have been identified to address the typical operations in auto body shops.

Sanding Waste Management
Dry sanding creates dust that is hard to manage and control. When released into the air it creates a dusty work environment, compromises worker health and safety, and adversely affects the quality of paint jobs. Wet or dry sanding waste may contain heavy metals and present an environmental hazard if washed down storm drains or discarded as solid waste. Vacuum sanding is selected as the best management practice to control dust. If wet sanding is done, then one should minimize water usage, collect waste in a clarifier or drip pan, and discharge the clarified water to the sewer.

Pollution Prevention and Waste Water Management
Many auto body shops unknowingly discharge illegally to storm and sanitary sewer systems. The wastewater management recommended practices are spill prevention and floor cleanup, proper management of sanding waste, training, and good housekeeping. Recommendations for car washing focus on keeping wash water out of storm drains, use of clarifiers, and closed loop recycling of wash water.

Minimizing Paint Waste
Efficient paint usage results in cost savings from purchase of expensive paint materials, reduced VOC emissions, and lower waste disposal costs. P2 strategies include reducing paint waste through inventory management, tracking, and troubleshooting; improving estimation and color matching; and making changes to improve shop efficiency and productivity. Disposable calibrated paint gun liners are promoted as a way to reduce paint waste, solvent usage, and labor. Incentive programs are recommended as an option to encourage employees to find opportunities for reducing paint waste and wasteful practices throughout the shop.

Paint Spray Gun Cleaning
The majority of automotive refinishing shops use paint thinner or solvents exempt from air regulations, such as acetone or methyl acetate to clean spray guns. These solvents evaporate quickly presenting risk to worker health and safety and are flammable. Efficient solvent use provides cost benefits from reduced product purchase and hazardous waste disposal costs.
The P2 strategy for spray gun cleaning includes efficient use of cleaning solvents through two-stage cleaning and use of enclosed automatic gun washers. Water-based gun cleaning systems use solutions containing regulated VOCs with low-vapor-pressure and low-toxicity and are recommended where allowed by air district regulations. The systems clean effectively for extended periods without a changeout of the solvent, and thereby reduce hazardous waste, product purchase costs and hazardous waste disposal costs.

Solvent Recycling
Mixed solvent and paint waste from paint gun cleaning is the largest hazardous waste stream generated by the automotive refinishing industry. Recycling on or off site to recover cleaning solvents for reuse is the most environmentally responsible approach to

managing this waste stream. Unfortunately, there are very few options for off-site closed-loop recycling – most off-site recycling facilities blend spent solvents and sell them as fuel. Shops using on-site solvent recycling equipment have found them to be a cost-effective alternative to proper off-site management of spent gun cleaning solvent. On-site solvent recycling, where allowed by local regulations, is the recommended practice. Shops should check with both their local fire department and air district before investing in equipment because of fire safety concerns and air district restrictions. If an off-site recycling service is used, the suggested practice is to find a closed-loop recycler, if possible.

Waterborne Coatings
Paint manufacturers have developed effective waterborne coating systems that are being used by car manufacturers around the world, many refinishing shops in Europe, and a small number of refinishing shops in the United States. Paint manufacturers supplying the refinishing industry in California estimate that continually increasing restrictions on VOC content will force the trend to waterborne coatings in the next 3 to 5 years, starting with primers and base coats. The P2 strategy is to plan for using waterborne coatings systems by 2008 and prepare for this change when making capital investments in equipment, such as a downdraft spray booth that supplies heat and air circulation during curing.

Develop Training Materials
The project team developed draft fact sheets describing the P2 and Best Management Practices listed above as part of the training materials package. The draft fact sheets were used to explain the identified practices to the project advisory team to get their comments on these practices. The media contractor began filming practices at local shops in early September 2005 to develop a training video.

In addition to the P2 and BMP fact sheets, the project team developed a hazardous waste compliance assistance fact sheet, a P2 checklist for shop practices, and a health and safety resources fact sheet. Early research for this project indicated that most shop owners and inspectors would mutually benefit through increased compliance awareness and assistance. To address this need, fact sheets specific to auto body & paint operations were developed on hazardous waste identification and management, and health and safety requirements. A self-audit checklist was also developed as a tool for shop owner/operators to use to assess their performance with respect to compliance and implementation of best management practices.

Stakeholder Involvement and Partnerships
Three advisory team meetings were held to review draft program materials, gain stakeholder input, and generate discussion on what should be included in the auto body and paint P2 program in terms of training, outreach and informational materials. The meetings were held in June and July of 2005, in Sacramento, Berkeley, and Torrance, California. Advisory team participants included:

- Five autobody and paint shop owner/operators;
- Three representatives from business assistance centers in Sacramento, Los Angeles, and Eureka;
- Three industry training and service providers;

- Five inspectors and/or representatives from CARB and air quality management districts including South Coast, Bay Area, and San Joaquin;
- Seven inspectors representing CUPAs and public utilities from the general San Francisco Bay and Los Angeles areas;
- Two representatives from the California Autobody Association; and

A representative from the Institute for Research and Technical Assistance (IRTA), a non profit organization committed to helping reduce the use of ozone depleting solvents.

The stakeholders agreed with most of the proposed best management practices and P2 strategies promoted in the draft fact sheets, and provided suggestions for improving content, clarity, and credibility. They also suggested that the team consider the specific target audiences when designing the format and wording for the documents.

The stakeholders provided valuable information and program development insights. Suggestions for program outreach, promotion and distribution included working with corporations, State and local

regulatory agencies, green business assistance organizations, and educating the industry about the program through trade associations, suppliers, direct repair networks, and respected industry publications. Stakeholders also suggested incentives such as green business marketing, regulatory relief, and insurance relief. Some stakeholders agreed to become part of an active advisory team to beta test the fact sheets and training materials. They also agreed to help develop an overall marketing/project promotion strategy.

Training Program Development

The training program will include workshop training sessions supplemented by training videos, fact sheets, the self-audit checklist and links (including contact information) for resources such as local agencies, business assistance centers, and service providers. To encourage broader usage of the training materials, presentations will be made to industry trade associations, local regulatory agencies and other involved organizations on the availability of developed training materials and how they may obtained via the DTSC website and otherwise. Several activities are underway to build the training program including:

- August 2005-May 2006: Work with a media contractor who will be filming at a number of automotive refinishing shops during Fall 2005 and producing four to six training segments using the information from the fact sheets and incorporating interviews and testimonials from shop owners and workers;.
- August 2005- October 2005: Finalize the fact sheets and self audit checklist by incorporating stakeholder input and working with a media contractor to ensure that the wording is appropriate for the target audience and the format promotes ease of use;
- September-November 2005: Develop training presentations (i.e., PowerPoint) that can be used by DTSC, local agencies, training centers, or other project partners to deliver the program.

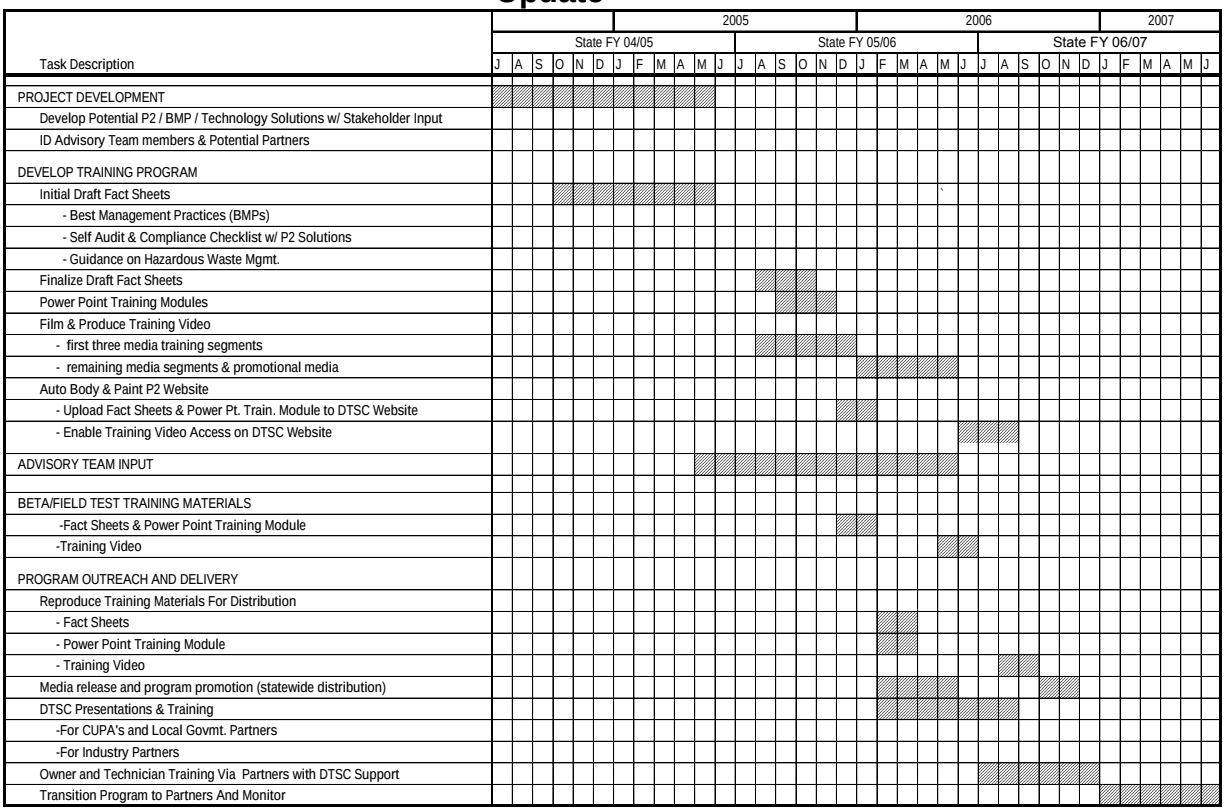
FUTURE TASKS

Training Program Development
Activities to be completed:

- December 2005 –June 2006: Field test the training program with a small group of stakeholders, then modify as needed; and
- February 2006- September 2006: Reproduce training and promotional media (fact sheets, DVDs, CDs) and translations, and make available via the internet.

Program Delivery
Once all of the elements of the training program and supporting materials have been finalized, the project team will start working with the inspectors from the CUPAs and other regional and local government environmental programs, green business programs and business environmental assistance centers, industry trade associations, and other project partners to increase their knowledge of the program and encourage their support. DTSC and its program partners will conduct outreach and provide training and support to the industry. The project team plans to deliver the training program through organizations such as the California Autobody Association, vendor training centers, and paint supply distributors.

Table 9: Project Schedule Auto Body and Paint Pollution Prevention Project September 2005 Update



Section 4: Other DTSC Pollution Prevention Activities

Marketing

Pollution prevention is not new. What is new is OPPTD's marketing approach to pollution prevention. Since P2 is voluntary, the acceptance, implementation and adoption of pollution prevention are driven by market forces. Therefore, OPPTD is now relying on marketing and building business relationships to design and implement its P2 programs. OPPTD has realized it needs to think like "them", to understand how and why pollution prevention makes good business sense to our private sector clients.

Marketing is essential to pollution prevention. Pollution prevention is conceptually different from pollution control. Pollution control is typically enforcement-driven and relies on capturing pollutants after they are created and hopefully before their release into the environment. Pollution prevention, on the other hand, or as some people say, at the other end of the pipe, focuses on eliminating or reducing environmental waste before it is generated. Although pollution prevention is voluntary, it can make very good business sense if approached as a business decision. Pollution prevention is solution-based. It provides problem solving opportunities driven by a variety of business motivators including: economics, public relations, image, market positioning and compliance. Through marketing, pollution prevention can capitalize on these business motivators and problem solving opportunities that make good business sense and offer our clients programs that eliminate or minimize pollution before it starts, increase efficiency, reduce operating expenses, decrease employee exposure to harmful chemicals, and reduce long term liability.

To create a successful P2 program, it is important for OPPTD to develop partnerships with the private sector. What appears on the surface to be a simple dynamic between government and business is actually very complex. OPPTD has learned through its marketing efforts that, to expect a business to devote its scarce resources to a voluntary environmental program, it needs to think like a businessperson.

Successful marketing also includes a marketing research component. Marketing research for OPPTD assists with evaluating opportunities for future program direction, development, and expansion. Marketing research in this context would evaluate the short and long term potential outcomes and probable environmental benefit of potential future program considerations. Marketing research, as practiced in the private sector is integral to the initial decision making process to develop a new product or service idea by assessing the probability of success. The same concept is also beneficial in the strategic decision making process in the government sector, whether it is for present or future program direction, by determining the various factors of success and evaluating the variables associated with each factor relative to the expected outcomes of the proposed program idea.

Vehicle Service and Repair Project

Project History

Californians are concerned about the quality of their environment and are vitally interested in ensuring that the generation and release of toxic and other hazardous substances is minimized. In response to this concern, the legislature has augmented the State's hazardous waste source reduction program within CAL/EPA's DTSC, with the SB 1916 enactment in 1998. The legislature also directed DTSC to convene Advisory Committee to help determine how to target DTSC's pollution prevention resources. SB 1916 requires DTSC to select a small business industry for special pollution prevention program focus. In July 2000, with the assistance of the Advisory Committee, the Vehicle Service and Repair (VSR) industry was selected. OPPTD embarked on an ambitious project requiring partnerships with varied number of stakeholder groups, including but not limited to, industry associations and labor groups, local governments, parts distributors, motorist and consumer groups, State agencies, and environmental and community groups. The program is currently in its'04/06 workplan cycle.

Training

Results and Progress from July 2000 through February 2006

DTSC distributed numerous P2 resources directly to local agencies, businesses and industry partners. Numbers for materials distributed through February 2006 are shown:

Toolkits	12,450
Hydrophobic Mops	7,200
Auto/Fleet Videos	3,100

The VSR P2 training program continues and the workshop dates are posted on the DTSC web site. A summary of training related activities and respective audiences conducted from October 2000 through February 2006 are shown:

Training sessions by DTSC	95
Total number of participants	1974
Total number of CUPA's receiving P2 training	41
Total number of non-CUPA agencies	137
Number of private businesses	304
Number of public fleets	89
Conferences to date	16
P2 Model Shop Recognitions	63

Resource Updates
VSR online training is now available for use on the DTSC website.

Model Shops
(Recognitions for the next quarter) DTSC will recognize nine (9) California National Guard Maintenance facilities. Individual presentations for these facilities will occur at the Northern and Southern California Department of Defense Annual Maintenance Conferences occurring March 2006.

DTSC P2 Model Shop Recognitions 2001 to Present

State Facilities	**36**
Federal Facilities	**8**
Utility Districts	**2**
Private Fleet	**4**
Municipal Fleets	**5**
Municipal Transit	**2**
Auto Repair Shops	**6**
Total Facilities	**63**

Exit Strategy
The Vehicle Service and Repair project is scheduled to end in **June 2006**. OPPTD continues to conduct follow-up site visits at facilities that received DTSC P2 Model Shop certifications. The site visits will involve collecting waste reduction and cost savings data at these facilities, which will in turn be used for case studies and measurement analysis as part of the Final VSR Project Report. DTSC is also filming video at various facilities to document individual successes in the implementation of the program as a whole and/or individual P2 measurers that have been successfully implemented. The videos will be formatted into electronic media that can be accessed on the department website for future use as a resource for government and non-government agencies continuing with the VSR outreach programs. All training and program resources will be made available to local agencies, industry and consumer associations, and federal and State agency partners to encourage their full implementation of the VSR program without direct DTSC involvement. These organizations will be actively pursued to assume an independent role in implementation of the VSR Project.

Mercury (Hg) Elimination Leadership Program (HELP)

Project History

The Department of Toxic Substances Control (DTSC) undertook a voluntary pollution prevention (P2) program with the goal of virtually eliminating the presence of mercury in California hospitals by the end of 2005. This P2 effort is called the "Mercury Elimination Leadership Program" or HELP for short. The challenge was issued to over 500 California hospitals by correspondence on November 4, 2002. The letter was sent to the hospitals' administrators and hazardous waste or health and safety officers. Copies of the letters were also sent to the hospital's local enforcement agency and publicly owned treatment works (POTW). DTSC is using the definition for a "general acute care hospital" under Health and Safety Code Section 1250(a) to define the hospitals targeted for this project.

Partners

In the spring of 2002, DTSC met with the Department of Health Services (DHS) because of previous mercury elimination work with them to develop a partnership for this project. Other partners on this project have been the California Healthcare Association (CHA), California Water Environment Association (CWEA), United States Environmental Protection Agency (U.S. EPA) Region IX, and Hospitals for a Healthy Environment (H2E). All of the partners in this project have supported us through advertising our training sessions and encouraging their members to enroll in HELP. As a hospital signs up to be a partner with HELP, they are also given the option to have DTSC enroll them as a member of H2E. A hospital reaching virtual mercury elimination not only receives recognition from DTSC, but also qualifies for the national H2E "Making Medicine Mercury-free" award.

The POTWs are encouraged to partner in HELP with their local hospital. In April of 2004, DTSC sent a letter to the sixty largest POTWs inviting them to join with us in seeking the virtual elimination of mercury waste in hospitals by participating in HELP. This outreach letter included a sample letter for the POTWs to customize and send to their local hospitals. Santa Cruz County Sanitation District, Eastern Municipal Utility District in Riverside County, Oro Loma Sanitary District in Alameda County, and Central Contra Costa Sanitary District in Contra Costa County each hosted HELP workshops. Los Angeles County Sanitation District, Orange County Sanitation District, and the Inland Empire Utility Agency also co-hosted a workshop for Los Angeles and Orange Counties.

Resources Update

A mercury reduction toolkit/CD with appropriate publications and resource information was developed to provide many of the tools needed for hospitals to eliminate mercury from their facility. These tools include: a list of mercury-containing devices in the healthcare setting, a spreadsheet to account for the mercury sources, a list of licensed mercury recyclers and take-back programs, proper disposal of pharmaceuticals, and the Universal Waste Rule for the proper handling of discarded mercury products. Forms for

enrolling in the program are included, along with additional resources for hospitals implementing pollution prevention. A simplified spreadsheet was developed for the hospitals. This spreadsheet works best for hospitals that have completed their mercury elimination. The original assessment tool is very in-depth and works best for hospitals just beginning mercury elimination.

Outreach

DTSC initially focused on outreach to the hospital system administrators. With commitment from the hospital system administration for their member hospitals to work on mercury elimination, hospitals were able to get the funding needed to replace their instruments, approval to replace the previous laboratory procedures, and devote the time necessary to complete the transition. Catholic Healthcare West, Sharp HealthCare, St. Joseph Healthcare, and Tulare District Healthcare System each sponsored training.

A corporate certificate was designed for hospital systems that achieve a mercury reduction of greater than 75%. In 2003, Sutter Healthcare was the first healthcare system to receive the corporate certificate. With an overall mercury reduction of 93%. Kaiser Permanente was awarded a corporate certificate on June 7, 2005, at Kaiser Permanente's National Environmental Health and Safety Meeting in Walnut Creek for attaining a greater than 90% mercury reduction. St. Joseph Health System received their corporate certificate on January 5, 2006 for having achieved a 98.2 % mercury reduction.

County hospitals were targeted through the California Association of Public Hospitals and Health Systems (CAPH) and encouraged to participate in HELP. CAPH has published articles on the HELP program and encourages its members to attend training. Ventura County Medical Center hosted training for HELP.

Local governments and the pollution prevention committees have supported the HELP program through their contacts with POTWs and hospitals. They have helped in locating facilities to host workshops, co-hosted workshops, and provided key speakers for some workshops. The Monterey Bay Area Pollution Prevention Group co-hosted a workshop in Santa Cruz, North Coast Pollution Prevention Committee hosted a workshop in Fortuna for Humboldt County, and San Diego County co-hosted a workshop in San Diego County.

DTSC and DHS continued these outreach efforts and promotion of mercury elimination and the HELP program by displaying an information booth at the Hospital Alliance Association (HospAA) 2005 One-Day Conference on June 29, 2005, in San Diego. The conference audience included hospital environmental services personnel and managers, infection control practitioners, physicians, dentists, safety officers, hazardous materials coordinators, and engineers.

Training

Outreach to the hospitals during the last year has been through DTSC training sessions. These training sessions are held at hospitals, POTWs, and local government facilities. The main focus of the training sessions is mercury elimination. Hospitals have many current issues of interest, and DTSC has utilized those interests to improve attendance and recruitment to the HELP program by offering workshops with a variety of speakers. Topics include: mercury elimination, the Universal Waste Rule, the proper disposal of pharmaceuticals, local waste water issues, medical waste disposal, and the West Nile Virus. Most hospitals and POTWs are enrolled in the program through the reminder telephone calls made prior to the workshops. Twenty-four training sessions in mercury elimination were provided to almost 1000 attendees interested in hospital pollution prevention. Those in attendance statewide have included hospitals, POTWs, and local government enforcement staff.

Changes resulting from survey suggestions include the design of a new 1”x1” sticker to identify mercury-containing devices. The sticker is beneficial during a hospital audit when mercury-containing devices not subject to removal are properly tagged. This helps to ensure proper handling when replacement occurs. Further, all workshop attendees were given copies of all presentations and time is built-in for networking.

HELP Participants and Awards

DTSC works with DHS to certify when a hospital has become mercury-free. To date, certificates of appreciation have been presented to 79 hospitals that successfully eliminated mercury sources for which there were replacements, and that have a plan for properly dealing with other sources upon removal or when alternatives become available. Banners designed by DTSC were presented to hospitals to announce their accomplishment. The 79 HELP award recipients are listed below.

HELP Award Recipients

Alhambra Hospital Medical Center
Alta Bates Summit Med Center – Ashby Campus
Alta Bates Summit Med Center – Herrick Campus
Alta Bates Summit Med Center – Summit Campus
Anaheim Memorial Hospital
City of Hope National Medical Center
Downey Regional Medical Center
Eden Medical Center
Eden Medical Center – San Leandro Hospital Campus
John Muir Medical Center
Kaiser Permanente Baldwin Park Medical Center
Kaiser Permanente Bellflower Medical Center
Kaiser Permanente Fontana Medical Center
Kaiser Permanente Fremont Medical Center
Kaiser Permanente Fresno Medical Center
Kaiser Permanente South Bay Medical Center (Harbor City)

Kaiser Permanente Hayward Medical Center
Kaiser Permanente Los Angeles Medical Center (Sunset)
Kaiser Permanente West Los Angeles Medical Center
Kaiser Permanente Oakland Medical Center
Kaiser Permanente Panorama City Medical Center
Kaiser Permanente Redwood City Medical Center
Kaiser Permanente Richmond Medical Center
Kaiser Permanente Riverside Medical Center
Kaiser Permanente Roseville Medical Center
Kaiser Permanente Sacramento Medical Center
Kaiser Permanente San Diego Medical Center
Kaiser Permanente San Francisco Medical Center
Kaiser Permanente San Rafael Medical Center
Kaiser Permanente Santa Clara Medical Center
Kaiser Permanente Santa Rosa Medical Center
Kaiser Permanente Santa Teresa Medical Center (San Jose)
Kaiser Permanente South Sacramento Medical Center
Kaiser Permanente South San Francisco Medical Center
Kaiser Permanente Vallejo Medical Center
Kaiser Permanente Walnut Creek Medical Center
Mammoth Hospital
Marian Medical Center
Marin General Hospital
Memorial Hospital Los Banos
Memorial Medical Center Modesto
Mercy Medical Center - Redding
Mills Peninsula Health Services
Mission Hospital Regional Medical Center
Novato Community Hospital
Petaluma Valley Hospital
Presbyterian Intercommunity Hospital
Queen of the Valley Hospital
Redwood Memorial Hospital
Saint Louise Regional Hospital
Salinas Valley Memorial Hospital
Santa Clara Valley Medical Center
Santa Rosa Memorial Hospital
Scripps Mercy Hospital
St. Agnes Medical Center
St. Elizabeth Community Hospital
St. Joseph Hospital - Eureka
St. Joseph Hospital – Orange
St. Jude Medical Center
St. Mary Medical Center – Apple Valley
Sutter Auburn Faith Hospital
Sutter Coast Hospital

Sutter Davis Hospital
Sutter Delta Medical Center
Sutter General Hospital
Sutter Lakeside Hospital
Sutter Maternity and Surgery Center
Sutter Medical Center of Santa Rosa
Sutter Memorial Hospital Sacramento
Sutter Roseville Medical Center
Sutter Solano Medical Center
Sutter Tracy Community Hospital
Sutter Warrack
Stanford Hospitals and Clinics
Tulare District Healthcare System
University of California San Francisco/Langley Porter Psychiatric Institute
University of California San Diego Medical Center
Veterans Affairs Central California Healthcare System
Veterans Affairs San Diego Healthcare Systems

Approximately 1.9 million grams or 4142 pounds (two tons) of mercury were removed from these 79 hospitals. One hundred eighty-five hospitals and twenty-seven POTWs have joined the HELP program. Photos from some of the awards ceremonies are posted on the website at http://www.dtsc.ca.gov/HazardousWaste/Mercury/HELP/index.cfm . The website became available on January 30, 2004. It lists many of the partners, allows hospitals and POTWs to enroll online, and contains all of the materials in the mercury toolkit/CD along with other useful healthcare pollution prevention links. A new page will be added to the website that lists the healthcare systems that received the corporate certificate of appreciation.

Exit Strategy

The goal of the voluntary partnership of the American Hospital Association, U.S. EPA, and Health Care Without Harm was virtual elimination of mercury waste generated by hospitals by 2005. In conjunction with this, DTSC ended the active recruitment of hospitals to the HELP Program by December 31, 2005. The intent is to transition the HELP program to local government partners. Several POTWs have already indicated their interest and pursued HELP implementation. As part of this transition, HELP awards are scheduled to be presented to the following hospitals by local governments: Mercy Medical Center in Redding by the City of Redding (February 7, 2006), Santa Clara Valley Medical Center by the City of San Jose (March 21, 2006), Eden Medical Center – San Leandro Hospital Campus by the City of San Leandro, and Downey Regional Medical Center by Los Angeles County Sanitation District (February 9, 2006).

DTSC will also notify local government agencies of this transition by personal telephone calls, emails, and listserv postings. DTSC will provide copies of all materials currently in stock and the template for the certificates to local government partners. Local governments will be asked to collect the hospital certification form and excel spreadsheet and provide the certificates of appreciation. DTSC will ask that the forms be forwarded to us so we can track the success of this transition and maintain the database.

DTSC will also continue to nominate hospitals for the Hospitals for a Health Environment Making Medicine Mercury-Free award. The 79 hospitals that received the HELP award have/will receive the MMMF award. Only 60 other hospitals nationwide have received this award.

If enough interest is expressed, DTSC may explore the production of a training videotape and reformatting the mercury elimination materials for outreach to private physician offices and medical groups.

Pollution Prevention in Schools

As part of the project selection process for this workplan, and because of a significant interest in the agency for improving children' s health, DTSC P2 staff researched potential pollution prevention projects in schools. There are many programs underway that work toward improving environmental conditions in schools, operated by many agencies at the federal, State and local levels. There is also considerable variability between individual schools and school districts with respect to environmental conditions, so identifying a specific problem common to all, or even most, schools that would be appropriate for a DTSC P2 project was not possible.

U.S. EPA has developed a software tool, the "Healthy Schools Environments Assessment Tool" (Healthy SEAT). Healthy SEAT, based on the Los Angeles Unified School District's successful assessment program, is an easy-to-use management tool designed to enable school staff to institutionalize and make routine the identification, evaluation and remediation of environmental issues in school facilities. The tool is comprehensive and includes issues such as school siting and construction, indoor air quality, janitorial products, pesticide use and chemical storage in science labs. The tool was beta-tested in early 2005 and introduced for use in January 2006 by U.S. EPA.

DTSC sponsored a presentation on the tool to relevant agency staff in September 2005. Attendees included representatives from Cal/EPA's boards, offices and departments, and other California State agencies that work with schools or on school facilities, such as the Department of General Services, the Department of Health Services, the Department of Education, and the California Energy Commission. There was considerable interest in the tool and some initial interest in working to add California-specific information.

DTSC's P2 program is working with U.S. EPA schools staff and State agencies to provide information to U.S. EPA that would allow customization of the tool for California. Such customization would add considerable value to the tool, could increase its use in California, and could help State agencies in their work by bringing more schools staff to State program information.

WSPA Technical Forum

The third technical forum between OPPTD and the Western States Petroleum Association is being planned for late spring 2006. This jointly sponsored technical forum with the largest hazardous waste generator in California may be expanded beyond its original pollution prevention focus to include other divisions within DTSC.

Implementation of the Hazardous Waste Source Reduction and Management Review Act (SB 14, 1989)

The Hazardous Waste Source Reduction and Management Review Act (SB 14) requires that larger quantity generators evaluate source reduction opportunities and report on accomplishments every four years. The next set of SB 14 documents, including the Source Reduction Plan, the Hazardous Waste Management Performance Report and the Summary Progress Report (SPR), will be due September 1, 2007.

The four-year planning horizon within SB 14 causes DTSC's work in this area to be cyclic in nature. During the first two years after the plans are due, DTSC gathers data and assesses industries' source reduction efforts. During the year before plans are due, DTSC focuses on outreach to alert the regulated community that plans are again due the following year. Every year, DTSC makes presentations related to SB 14, answers generator questions and/or provides training.

2002 SB 14 Summary Progress Report (SPR) Enforcement Initiative
Prior to 1999, facilities subject to SB 14 were not required to submit any source reduction documents to DTSC unless DTSC specifically requested them. In 1998, a statutory change instituted the "SPR," with a requirement for all businesses subject to SB 14 to submit their SPR to DTSC. For the first time, generators were required to prepare and submit documents indicating compliance with SB 14. This has enabled DTSC to more accurately determine the number of facilities that are covered by the program, identify facilities that have not complied with SB 14, and identify facilities that are no longer required to report.

For the previous SB 14 reporting period of 2002, DTSC used information compiled from the submission of SPRs to identify facilities that were not in compliance with SB 14 reporting requirements. DTSC mailed non-compliant generators notices informing them of their SB 14 status and their reporting requirements. The initial letter was sent to approximately 1,400 facilities. A follow-up letter was sent to 500 that did not respond to

the first letter. An additional 200 certified letters were sent to facilities that failed to submit their 1998 and 2002 SPRs. As part of the effort, staff responded to hundreds of phone calls, received and logged SPRs and prepared correspondence continuing through 2004.

As a result of staff working with the non-compliant facilities, all facilities either complied with SB 14 by submitting a SPR or were determined to be exempt from SB 14.

As a result of staff efforts our records show the following:

- approximately 1,700 facilities submitted SB 14 documents/Summary Progress Reports;
- approximately 1,200 facilities self-certified as exempt from SB 14 requirements due to closure, exempted waste streams, small quantity generators, etc.

As facilities submit their SB 14 documents, DTSC staff conducted completeness reviews. Facilities were contacted regarding these reviews and the SB 14 program. With this second SB 14 enforcement project completed, three on-going goals have been achieved:

- increased awareness of source reduction and the SB 14 program,
- increased SB 14 compliance, and
- refinement of the SB 14 database.

DTSC is continuing this enforcement process through the next SB 14 reporting cycle, which will begin in September 2007 with industry's preparation of SB 14 source reduction documents including the submittal of the next SPR. DTSC will be mailing non-compliant generators notices informing them of their SB 14 status and their reporting requirements as was done during the previous two reporting cycles. This will require staff working through 2008 to identify and work with non-compliant generators to assist them return to compliance.

With improved budget and data management conditions it is anticipated that future enforcement initiatives will be planned to enable the first enforcement mailing to occur during the first week following the September 1 document receipt deadline. We anticipate a continued trend of fewer generators in our enforcement universe. This will mean a shorter and more direct return to compliance effort.

Source Reduction Plan Reviews
A major task under SB 14 is the source reduction plan review process. This involves determining which industries to target for study, developing lists of generators within the target industry sectors, and formally requesting submittal of their plans and reports. The purpose of the review is twofold: to assure compliance and to identify viable source reduction alternatives that can be shared throughout the industry. During fiscal year 002/03, DTSC called in SB 14 documents from the chemical industry. Formal requests for these documents began in the late fall/early winter of 2002 with the review process continuing for the remainder of the fiscal year and the last half of fiscal year 2002/2003. Staff completed the SB 14 assessment for the chemical industry sector in May 2004. In addition, staff has been reviewing SB 14 documents that were submitted voluntarily from generators. Approximately 115 SB 14 documents were reviewed by staff from late 2003 to mid 2005. Generators continue to voluntarily submit SB 14 documents and staff will continue to conduct reviews during the current and upcoming SB 14 cycle.

New SB 14 Reporting Cycle
Commencing in fiscal year 04/05, the program will conduct activities associated with the development of the next set of plans, which are due to DTSC by September 1, 2007. During the Fall of 2006, the SB 14 Guidance Manual will be updated and reprinted. Between Fall 2006 and September 2007, staff will conduct extensive outreach to the regulated community. This will include sending a notice to every SB 14 generator reminding them of the requirements as well as workshops for affected generators, consultants and local agencies. SB 14 workshops and presentations will be given statewide, informing the regulated community of SB 14 requirements and reminding them of the compliance date for source reduction plans, hazardous waste management reports, and SPRs. From the last part of 2003 and through the first 6 months of 2005, staff gave over 125 SB 14/P2 presentations to nearly 4,000 attendees including generators, consultants and local agencies (CUPAs).

Industry assessments are also being prepared based on SB 14 reporting documents. By Fall 2005, staff will have completed a 2002 assessment of the petroleum refining industry based on the last set of SB 14 documents. This assessment will be published late 2005. Staff is also initiating work on industry assessments for both the pharmaceutical manufacturing industry and the fabricated metals industry. Both of these assessments will be completed in Spring 2006.

Staff also completed a 1998 and 2002 assessment of the source reduction efforts of the semiconductor industry is complete. SB 14 documents from selected semiconductor facilities were reviewed, with the assessment report available in print and on DTSC's pollution prevention website. Furthermore, OPPTD staff co-presented SB 14 compliance issues at the November 4, 2004 Semiconductor Environmental, Safety and Health Association (SESHA) conference in Sunnyvale. OPPTD staff's presentation fitted well with the co-presenter, an environmental consultant who discussed his first hand experience related to using SB 14 as a way of reviewing company waste streams and the significant benefits gained by facilities choosing to implement source reduction measures. DTSC has previously partnered with SESHA in 2003 when DTSC and

SESHA jointly held a one-day pollution prevention mini-conference which was well-attended by representatives of California's major semiconductor companies. Presentation materials for the 2003 conference are available at SESHA's website (http://www.semiconductorsafety.org) and at DTSC website (http://www.dtsc.ca.gov).

2002 SB 14 Summary Progress Report Data

The 2002 SB 14 SPR database contains general facility information such as location and type of business. Hazardous waste source reduction data is the central focus of the SPR and is presented in both a retrospective and forward looking manner. The most basic source reduction data collected is total source reduction achieved and source reduction projected by the individual reporting facilities. Source reduction achieved gives the quantity of hazardous waste that a specific facility has reduced due to their implementation of some type of change in their manufacturing process during the previous four year period. Source reduction projected gives the quantity of hazardous waste that a specific facility estimates that they will optimally reduce due to the implementation of some type of planned change in their manufacturing process over the next four years. These two data fields can be displayed to present statewide or local trends or they may be industry, facility or waste stream specific.

The following is data from the 2002 SB 14 SPRs submitted to DTSC by more than 1,700 facilities. This data is a statewide indicator of both past and future hazardous waste source reduction activities.

- Total statewide facilities reporting = 1,746
- Total statewide quantity of hazardous waste generated = 25,900,00 tons
- Total statewide quantity of aqueous hazardous waste generated = 25,300,000 tons
- Total statewide quantity of non-aqueous waste generated = 600,000 tons
- Total statewide quantity of source reduction achieved = 550,000 tons
- Total statewide quantity of source reduction projected = 550,000 tons

Table 10: SB 14 Implementation Workplan Summary

Activities	Outputs	Comments
1. **Outreach & Education** -Organize and conduct training -Make presentations -Respond to inquiries	As requested or when DTSC determines need --increased compliance with SB 14 --increased quality of SB 14 efforts	Major efforts will start with revisions to the Guidance Manual in the fall of 2006. Extensive outreach Jan-Sept. 2007.
2. **SB 14 Document Request and Review**	--analyze data for targeting --technical review and analysis of approximately 100 source reduction plans --remote and onsite technical assistance, as needed --enforcement follow-up when necessary --results analysis --report preparation and distribution	New Source Reduction Plans and Reports are due Sept 2007.
3. **CUPA Assistance** -Technical assistance -Training	--cooperation of CUPA hazardous waste inspectors to promote P2 and SB 14 compliance --increased CUPA inspector capacity to review/enforce SB 14 plan requirements; --respond to CUPA requests for information, referrals	
4. Summary Progress Reports (SPR) -Summary Progress Report follow-up -Analyze and compile data	--increased compliance with SB 14 --publish results of SPR data analysis	

Project Support and Assistance Activities

DTSC participates in a number of projects for which DTSC's P2 program is not the lead, but a supporting player. These include:

- coordinating with U.S. EPA Region IX's Pollution Prevention Team (quarterly meetings, review and comment on projects and deliverables, serving as speakers at U.S. EPA sponsored workshops, etc);
- participating as one of the principals of the Western Regional Pollution Prevention Network (a consortium of P2 programs within U.S. EPA Region IX);

- conducting P2 projects and activities along the California/Mexico Border (conferences, training, technical assistance; and
- participating in national P2 workgroups (e.g., National Pollution Prevention Roundtable, the Forum on State and Tribal Toxics Actions, the Association of State and Territorial Solid Waste Management Officials, etc.).

Border P2 Training

DTSC has conducted seven training session along the California/Mexico Border related to pollution prevention, parts cleaning, and vehicle service and repair.

The Pollution Prevention Branch provides assistance to DTSC's Technology Development Branch on projects involving P2 technologies, including participating in final review panels. Resources are also expended on reviewing proposed State and federal laws and regulations, preparing federal grant applications (P2 Incentives to States, Resource Conservation and Recycling Act, etc.).

Because DTSC is not the lead organization on most of these projects, the level of resources that go into these projects tends to be limited by time and staff availability. Some of these projects may be quite deserving of more significant resource commitments if more staff time were available.

Table 11: DTSC P2 Participation Projects

Activities	Outputs	Comments
1. **Coordination with EPA Region IX** -Quarterly meetings -Provide speakers at EPA events	--ongoing coordination/communication with U.S. EPA P2 program	DTSC P2 staff work closely with U.S. EPA P2 staff to coordinate activities.
2. **Western Regional Pollution Prevention Network (WRPPN)** -Participate in Steering Committee and Advisory Board meetings -Assist in preparing reports for the federal grant -Assisting in preparing grant applications	--consistent and ongoing availability of P2 information, training and conference opportunities for CA local P2 programs.	This is an integral part of DTSC's support to California's local government P2 programs and USEPA Region IX's P2 Programs.
3. **Mexico Border** -Assist DTSC border coordinator -Attend State and regional committee meetings -Identify targets -Organize and conduct training -Respond to inquiries -Arrange for translations -Provide information for grant reports	--increased knowledge of P2 within border facilities --support to overall DTSC border efforts	This includes participation in multi-agency, multi-State or multi-national meetings.
Activities	**Outputs**	**Comments**
4. **National Programs** -Participate in NPPR conference (2) -Participate in periodic ASTWMO meetings (2-3 per year) -Participate in FOSTTA meetings (3 per year) --For each of the above, review and comment on U.S. EPA proposals	--consistent effort to include P2 as a primary element of environmental management system pilots. --increased DTSC knowledge of national efforts --continuing awareness of trends in environmental management and pollution prevention --ongoing training opportunities --DTSC input into national P2 initiatives	
5. **Laws and Regulations** -Review proposed laws and regulations from P2 perspective and provide comments	--exploit opportunities to provide P2 incentives through regulatory processes	Also see regulatory integration
6. **Grant Applications** -Prepare P2 grant applications for DTSC P2 funding -Prepare letters of support for others seeking grant funding	--exploit opportunities to fund special DTSC or local-level projects through federal funding	P2 grants have provided quality reports on low-VOC, low-toxicity alternatives for the lithographic and screen printing industries, and cleaners of laminated countertops.
7. **Dept of Commerce Loan Review**	--due to recent budget and organizational changes this program is not currently operational	--ensure loans are appropriate (P2, not treatment)

Local Government Support

California's regulatory structure places much of the day-to-day work with businesses, especially hazardous waste generators, at the local government level. For this reason, DTSC has consistently placed a high value on building and supporting local government P2 programs. DTSC's efforts in this area focus primarily on information transfer and assistance, especially through work with seven regional P2 committees that have been established to facilitate communications between local programs. Local programs participating on these regional committees include sewering agencies, local fire departments, air districts, environmental health programs, household hazardous waste collection programs, storm water run-off programs and regional water quality control boards. The regional committees typically meet on a bi- to tri-monthly basis. DTSC staff help plan meeting locations and agendas and participate in the meetings to share information between committees, as well as present information from DTSC, Cal/EPA, and the Western Regional Pollution Prevention Network (WRPPN).

Supporting Local Pollution Prevention Programs

During 2004-2005, DTSC:

- participated in over 48 local government P2 committee meetings designed to foster and support local government P2 efforts.
- co-sponsored National Pollution Prevention Week, in which local agencies, schools, and businesses conducted P2 events in their communities. DTSC printed and distributed over 16,000 P2 Week posters for the event.
- provided ongoing support for the Bay Area, San Diego, and the Monterey Bay Area Business Programs. Also introduced the Green Business concepts to Fresno, Humboldt, Santa Barbara, and San Joaquin Counties.
- co-sponsored and participated with the Western Regional Pollution Prevention Network annual P2 conference, which was attended by over 200 people in 2004 and 2005. Located speakers and trainers as well as served as session moderators.

DTSC is also a major sponsor and coordinator of the annual WRPPN P2 conference, a U.S. EPA Region IX supported event. DTSC serves on the WRPPN Advisory Board to discuss policy and priorities as well as select the conference site and formulate the conference agenda, locate speakers, and serve as session moderators.

Pollution Prevention Week (09/20-26/04 and 09/19-25/05) continues to serve as focal point and reminder that P2 is important throughout the year. DTSC worked closely with the East Bay Municipal Utility District to develop the P2 Week poster graphic, then printed and distributed the poster through-out the state and U.S. EPA Region IX. DTSC also updates and advertises the P2 brochure, calendar, and templates for press releases, proclamations, and radio announcements on its web page for use by local government programs.

Local Government P2 Integration Efforts

DTSC continues its tradition of strong support for local-level P2 program support. In the area of P2 integration, these efforts focus on supporting CUPA inspection and enforcement activities, and helping to link facilities needing help with P2 assistance providers.

Continued efforts to support P2 activities within the CUPA regulatory activities include:

- Working with Cal/EPA and DTSC CUPA oversight staff to promote the implementation of P2 SEPs within CUPA inspection, enforcement and compliance assistance activities;
- Providing training and support for CUPAs in their P2 compliance assurance activities (e.g., SB 14, “program in place” requirements, etc.);
- Working with local P2 assistance providers to ensure that facilities have a place to go when they need P2 information as they address compliance issues.

Table 12: Local Government Support Workplan Summary

Activities	Outputs	Comments
1. **Support Local Committees** -Attend regular meetings of 7 regional local govt. P2 committees -Technical support (publish/distribute minutes, etc.) -Establish new regional committees when appropriate (e.g., Shasta County and the Central Valley from Lodi to Merced)	-- support of dozens of California local agencies in each of the committees that provide P2 assistance and information to businesses -- increased multi-media coordination by working with local and regional P2 programs across all environmental media -- two new regional local government P2 committees	Local government staff in Shasta County and the Central Valley (from Lodi to Merced) have met to discuss the formation of new P2 committees. The future looks good for their continuation.
2. **Pollution Prevention Week** -Update outreach materials, place on DTSC web page, and advertise availability via list serves and e-mail to local and State programs. -Work with East Bay Municipal Utility District on poster; print & distribute.	--publish and distribute 16,000 posters used by local government. Staff, businesses, and schools in hundreds of public locations statewide --provide updated P2 outreach and promotional materials to local government agencies during 09/2026/05 and 090/19-25/05.	Excellent opportunity to focus on P2 and provide support for the rest of the year to continue and build programs.
3. **Annual P2 Conference** -Work w/ committees on agenda training and session topics -Coordinate with WRP2 Network on event logistics -Assist in securing speakers -Moderate sessions -Attend conference -Distribute results/discuss at local government programs.	--training/conference materials, excellent source of speakers and technical experts for future meetings, great networking opportunity for local, State and federal P2 staff across California and U.S. EPA Region IX.	Large increase in sharing of P2 information, old and new. Expansion of dynamic P2 network throughout California and U.S. EPA Region IX.
4. **Bay Area Green Business Support** -Attend periodic meetings -Provide technical support on targeted industries -Review industry-specific criteria	--strengthened local government efforts to promote P2 to small businesses and to communities by recognizing "green" businesses. --improved coordination with local government --shared information	

At the DTSC regional level, DTSC has been funded through its Resource Conservation and Recovery Act (RCRA)[10] grant to support the Bay Area Green Business Program. This is an ongoing demonstration project managed by the Association of Bay Area Governments to show how market forces can encourage more P2 implementation.

[10] RCRA, the "Resource Conservation and Recovery Act," is the federal law governing the classification and management of hazardous waste. States authorized to implement this federal program receive funding through grants, in this case, the "RCRA grant."

Local governments in the San Francisco Bay area have developed industry-specific standards that include both compliance and P2 elements. "Green businesses" that meet the standards are given recognition by the local government and promoted to the public as a preferable place to conduct business. DTSC provides technical support to the program and assists with technical detail and coordination between various State and local regulatory agencies.

Integrating Pollution Prevention into Regulatory Programs

Compliance requirements can serve as an important motivator for businesses to implement P2. To be successful, pollution prevention must be viewed as a legitimate tool to be used by the regulatory programs to achieve their mission of protecting public health and the environment. DTSC continues to work toward the integration of P2 into regulatory activities, including inspections, enforcement, permitting, regulation development and the activities of the local-level hazardous waste regulatory agencies (which are overseen by DTSC's Hazardous Waste Management Program).

The long-term goal for integrating P2 into DTSC's regulatory programs is to assure that every interaction, whether permitting, inspections, enforcement, fee structures, regulations reform, technical assistance, etc., that DTSC has with the regulated community sends a consistent message about the value of P2 as the preferred approach for protecting public health and the environment.

P2 in Inspections and Enforcement
P2 staff, working with staff from the Statewide Compliance Division, provide recommendations to SCD management to help define DTSC's efforts in integrating P2 into inspections, enforcement, and compliance assistance activities. Concurrently, regional P2 staff is increasing efforts to accompany inspectors on selected inspections in order to:

- Provide information about P2 practices to facility operators.
- Help inspectors evaluate facility compliance with requirements to address waste minimization in their:
  - Annual Report, [CCR §66264.75(h-j) requirement for generators to provide, in its annual report, the following information:
    - A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated,
    - A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years, and
    - A certification signed by the generator or authorized representative;
  - Annual certification requirement for onsite facilities to certify that it has a "program in place to reduce the volume and toxicity of all hazardous wastes which are generated by the facility operations to the degree, determined by the permittee, to be economically practicable" (HSC §25202.9);
  - Biennial Report, [Title 22, CCR, §66262.41(b)(6)-(8)];

  - Waste minimization certification requirements in a facility's operating record [CCR §66264.73(b)(9)]; and
  - Hazardous Waste Source Reduction and Management Review Act source reduction documents (SB 14).
- Revise DTSC inspection checklists to integrate source reduction planning, certification, and reporting requirements.
- Provide information about P2 technical assistance providers.
- Provide information from DTSC's hazardous waste Tracking System (HWTS) to help facility operators identify waste generation trends over time.
- Explain the benefits of P2 to facility operators.
- Observe facility operations for development of a P2 Supplemental Environmental Project (SEP), should enforcement ensue.
- Assist in the development and oversight of SEPs.

Further refinement of roles and responsibilities in this area will continue to be developed, particularly in the area of tracking P2 activities and measuring results.

P2 in Permitting
The southern California regional P2 seniors in DTSC's Permitting Division are working to ensure that the permitting process sends appropriate messages with regard to P2. Efforts will focus on ensuring that the regulatory requirements described above (waste minimization certification, "program in place" requirements, and source reduction planning under SB 14 are appropriately addressed in the permitting process. To facilitate these activities, the Permit Writer's Manual will be revised to integrate source reduction and waste minimization planning, certification and reporting requirements. Model facility permits that include P2 will be developed for onsite and offsite treatment, storage, and disposal facilities (TSDFs).

Training
The development and implementation of training is one of the most important duties of DTSC's P2 regulatory integration staff. The P2 training program includes:

- Delivering workshops for hazardous waste inspectors on how to evaluate source reduction documents prepared pursuant to the Hazardous Waste Source Reduction and Management Review Act (aka SB 14);
- Developing and delivering training on P2 integration for permitting, inspection, and enforcement activities;
- Delivering training to support DTSC's SB-1916 P2 projects;
- Developing and delivering P2 training on Green Business cross-media Inspection;
- Developing and delivering training on PCB ballast lighting retrofits in schools; and

Guidance and Procedures Development
P2 regional staff continues to develop guidance and procedures for pollution prevention, as practiced by regulatory staff.

PBDE Ban Support
By collecting data on the presence of polybrominated diphenyl ethers (PBDEs) in humans, DTSC's Hazardous Materials Laboratory provided data to support the recent statutory ban of the use of polybrominated diphenyl ethers (PBDEs) as flame retardants in California.

Environmentally Preferable Purchasing and the Green Building Initiative
OPPTD staff contribute to the multiagency effort to implement the requirements of the Environmentally Preferable Purchasing (EPP) Law established in Public Contract Code sections 12400-12404 (Statutes of 2002). This law requires the Department of General Services and Cal/EPA to promote EPP within State government, develop and implement EPP training programs, and develop an EPP best practices manual.

OPPTD staff also contribute to the statewide effort to implement Governor Schwarzenegger's Executive Order S-20-04, the Green Building Initiative. The LEED (Leadership in Energy and Environmental Design) Green Building Rating System developed by the US Green Building Council is the national standard for high-performance, sustainable buildings. One of the directives of this Executive Order requires the State to design, construct and operate all new and renovated state-owned facilities as LEED Silver or higher certified buildings.

Technology Studies and Information Transfer

P2 Staff actively seek internal and extramural research funds to address pollution prevention alternatives for a number of business sectors. A major focus has been product substitution for toxic and volatile organic solvents (VOCs) now used in a variety of industrial settings. Listed below are short summaries of projects completed in 2004, those now in progress, or soon to be started, and their funding sources.

*Safer Adhesive and Cleanup Alternatives for Countertop Manufacturing (August 2004**)**

Prepared by Mike Morris and Katy Wolf, Institute for Research and Technical Assistance (IRTA). This project was funded by a U.S. EPA P2 Grant, NP-97937301-0, and DTSC.

IRTA worked with seven companies in the Los Angeles Metropolitan Area that adopted alternative adhesives and cleaning agents to 1,1,1-trichloroethane (TCA), methylene chloride (METH) and various types of non-chlorinated solvents including toluene, xylene, methyl ethyl ketone (MEK), hexane and heptane. The companies included countertop manufacturers, cabinet manufacturers and companies involved in woodworking. The alternative adhesives the companies adopted are polyvinyl acetate (PVA) adhesives, which rely on water as a carrier, various other water-based adhesives and acetone based adhesives. The cleaning agent alternatives that the companies implemented are plain water, water-based cleaners and acetone. IRTA determined that alternative adhesives are available, perform well, can reduce costs, and can protect human health and the environment.

*Alternative Low-VOC, Low-Toxicity Cleanup Solvents for the Lithorgraphic Printing Industry (November 2004)

Prepared by Mike Morris, Katy Wolf and Jon Zavadil of the Institute for Research and Technical Assistance (IRTA). Project was funded by a U.S. EPA P2 Incentives to States Grant, NP-98965501-2, and DTSC.

The Institute for Research and Technical Assistance (IRTA) worked with ten lithographic printing facilities in the Los Angeles Metropolitan Area to identify, test and demonstrate alternative low-volatile organic compound (VOC), low toxicity on-press cleaners. Businesses included in the study printed on newsprint (newspapers), coated and uncoated paper, and metal and plastic media. The types of presses were coldset web, sheet fed, and heat set web and types of ink included soy and solventborne.

In all cases, IRTA identified and tested alternative cleaners that had a VOC content of 100 grams per liter or less. The alternatives that were tested and found to be most effective include water-based cleaners, soy based cleaners and acetone, blends of the three categories of cleaners and blends of the cleaners with small amounts of VOC solvents. Acetone is not classified as a VOC and is low in toxicity.

*****Alternative Low-VOC, Low-Toxicity Cleanup Solvents for the Screen Printing Industry (April 2005)

Prepared by Mike Morris and Katy Wolf, Institute for Research and Technical Assistance (IRTA). Project was funded by a U.S. EPA P2 Grant, NP-97978601-0, and DTSC.

The Institute for Research and Technical Assistance (IRTA) worked with nine screen printers in southern California to identify, test, develop and demonstrate alternative low toxicity, low-VOC cleanup materials that performed effectively and were cost effective. The focus was on finding suitable alternatives that would be safer and would meet the VOC limit of 100 grams per liter. The printers that participated in the project used a range of different inks (UV, solventborne, waterborne, Plastisol) and printed on a variety of different substrates including fabric, paper, metal, glass, wood, ceramics and plastics. Some small screen printers print by hand but most commercial screen printer's use automated presses

The low toxicity, low-VOC alternatives that were tested included water-based cleaners, vegetable based cleaners composed of soy, and acetone, a chemical not classified as a VOC and low in toxicity, was blended with other materials. All three alternatives were found to effectively clean traditional solventborne inks for specific screen printing applications.

*Hydrocarbon Cleaning Alternative for the Professional Fabric Care Industry

The Department of Toxic Substances Control (DTSC) is funding the Institute for Research and Technical Assistance (IRTA) to identify the characteristics of the hydrocarbon dry cleaning process as one of the viable alternatives to perchloroethylene (PERC) now used in the dry cleaning. Most PERC dry cleaners are likely to adopt the hydrocarbon technology. However, much more needs to be known to better inform cleaners of its characteristics and optimal use before this change occurs.

The project team, consisting of IRTA, Southern California Edison (SCE), Kelleher Equipment Supplier, Inc., California Department of Health Services' Hazardous Evaluation System and Information Service (HESIS), and the Department of Toxic Substances Control (DTSC) will analyze the ability of tonsil, an absorbent to simplify the hydrocarbon cleaning process, evaluate and compare the energy use of the hydrocarbon process with and without tonsil and with a PERC dry cleaning process, assess the toxicity of the isoparaffin used in the process using existing toxicity information; and investigate the characteristics of all the waste streams generated in the hydrocarbon cleaning process to determine whether they should be handled as hazardous waste and whether the separator water can be discharged. The project was started on April 1, 2004 and will be completed March 31, 2006.

*Safer Alternatives To Toxic and VOC Spotting Chemicals in Dry Cleaning

The Department of Toxic Substances Control (DTSC) in partnership with the Institute for Research and Technical Assistance (IRTA) will receive a U.S. EPA 2005 Pollution Prevention Grant to characterize the spotting chemicals used today by the dry cleaning industry and to identify, test, demonstrate and develop alternatives to certain toxic and VOC spotting chemicals.

The project will characterize the toxic and VOC spotting agents used by the professional garment cleaning industry; estimate use/emissions/releases of the spotting agents, select five dry cleaning facilities willing to test alternative spotting chemicals; identify existing low-VOC, low toxicity spotting chemicals that could be used as alternatives; develop additional low-VOC, low toxicity spotting chemical alternatives; test existing and new alternative spotting agents in five cleaning facilities; and evaluate the performance, cost, toxicity and VOC content of the most promising alternatives and compare it with the performance, cost, VOC content, toxicity and cross-media issues of existing spotting chemicals. Project is scheduled to start on October 1 and be completed on March 31, 2007.

Jewelry Marts and P2

P2 staff continues to work with staff from the Hazardous Waste Management Program to address compliance problems with jewelry marts in Los Angeles. A study was conducted in 2003 to survey a representative number of manufacturers in the Los

Angeles Jewelry Mart to characterize the hazardous waste streams produced and identify the current management practices for those wastes.

Study results were used to identify currently unregulated waste management practices to aid in developing policy and regulations regarding hazardous waste generation and management in the jewelry manufacturing industry. These results were also used to develop educational materials to assist jewelry manufacturers statewide in complying with current statutes and regulations for hazardous waste management. P2 has been an important element of DTSC's work in this area. Educational materials for this industry will continue to include P2 information.

High Efficiency Oil Filter Demonstration in the State Fleet
DTSC's Office of Pollution Prevention and Technology Development (OPPTD) is demonstrating the performance of High Efficiency Oil Filters in the State fleet. These filters clean engine oil better than standard filters, which extends the time between oil changes, so that both oil purchase costs and waste oil generation are reduced.

The project began with a survey of over 2,000 State, local government, and private fleet managers that identified barriers to using high efficiency filters. The demonstration project is designed to measure the benefits and costs savings resulting from use of the technology. OPPTD has purchased filters for 100 State and local government vehicles. The Departments of Transportation (Caltrans), Forestry (CDF), Corrections (CDC), and General Services (DGS) are participating in the project. Participants will install the filters, collect oil samples, and record vehicle mileages and service events.

California State agencies purchased approximately 225,000 gallons of motor oil in 2003 for a fleet of 70,000 vehicles. The final report will detail the cost savings and waste reduction that could be achieved if the technology were adopted across the entire State fleet. The report will be used in DTSC's ongoing Pollution Prevention outreach efforts to federal, State, local government, and private fleets.

High Efficiency Oil Filter installed on a Caltrans service truck.

CDC is installing High Efficiency Oil Filters on ten buses and fifteen passenger vans.

LIFE CYCLE ASSESSMENT (LCA)

The Office of Pollution Prevention and Technology Development (OPPTD) is using LCA to compare the environmental consequences of various hazardous waste management methods. Different ways to collect, treat and dispose of hazardous waste, as well as prevent its generation, can result in significant impacts on the environment and human health. Using LCA methodology, comparison of the impacts and benefits of each method can be made on a "level playing field" because all external costs and life-cycle phases are considered.

Our study reviewing three methods for managing the 100 million gallons of used oil generated in California each year was published in Environmental Science and Technology (Vol. 38, No. 2). The results show that heavy metal air emissions from used oil fuels may cause 100 times the environmental impact of used oil management by re-refining or distillation.

Another OPPTD study comparing three methods for managing shredder residue to landfilling was recently accepted for publication in Resources, Conservation and Recycling. At their end of use, automobiles and appliances are shredded in order to separate and recover iron, steel and non-ferrous metals. The remaining waste (consisting primarily of plastics, rubber, glass and carpet) is called shredder residue. About 300,000 tons of shredder residue are generated each year in California. Currently the residue is treated with chemical fixatives such as portland cement to reduce the leaching of heavy metals and is then disposed in landfills. The large resource cost of treatment chemicals and the loss of the material resource and energy value of shredder residue by landfilling was studied. The LCA also indicated that using the shredder residue as fuel and mineral feedstock for cement manufacture could save over 100,000 tons of coal, 100,000 tons of mineral resources, 150,000 tons of landfill capacity (~1% of all landfilled municipal wastes), and 50,000 tons of treatment chemicals annually.

Part III:
Current Status of Hazardous Waste Generation from Manifest, and Biennial Report System Data in California: 1996-2004

Introduction

An understanding the current status of hazardous waste generation in California is essential to designing an effective P2 program. To further this understanding, DTSC staff reviewed data from the hazardous waste manifest tracking system (HWTS), and Biennial Generator System (BRS), focusing on the following questions:

What hazardous wastes were generated?

What industries generated hazardous waste?

How was the hazardous waste managed?

Which facilities generated the largest amounts of hazardous waste?

Two databases were used for this analysis: the Hazardous Waste Manifest Tracking system (HWTS), and Biennial Generator System (BRS) data. These data sets report on different aspects of hazardous wastes and materials. HWTS data reflect off-site hazardous waste management and are based on information contained in shipping documents known as California Uniform Hazardous Waste Manifests (manifests). The federal Biennial Generator System includes hazardous waste data collected from generators[11] every two years, as the name suggests. In this reporting system, generators report quantities of Resource Conservation and Recovery Act (RCRA) hazardous waste generated – that is, waste that is hazardous under the federal regulatory system. A large percentage of waste manifested in California, perhaps over 50%, is non-RCRA waste. Non-RCRA wastes are designated hazardous because of California's more stringent hazardous waste classification scheme.

The purpose of this analysis is twofold: to examine hazardous waste trends over time and to evaluate pollution prevention progress in California. One important point needs to be made before looking at this information: none of the data sets allows an assessment of total hazardous waste generated. The most significant reason is that none of the data sets captures quantities of hazardous wastewater that are treated onsite and sent to a publicly owned treatment works Because of this, it is not possible

[11] The term "generator" will be used throughout this analysis to describe businesses or public sector entities that produce hazardous waste.

to determine the total amount of hazardous waste generated in California. While we cannot state that manifested waste trends correlate exactly with total waste generated, those trends must serve as surrogates for total waste generation because total waste quantities remain unknown.

A Few Words About the Two Data Sets

To understand the analyses that follow, it is important to note the character, differences, and utility of the data sets used here (and in PART IV).

Manifest Data

The Uniform Hazardous Waste Manifest, a form of shipping document, must be completed by generators when shipping hazardous waste off site for management or disposal. The data within the manifest system come from information entered on manifests by these generators. Manifests contain information on the generator, transporter, and treatment facility, as well as information related to the type of waste (identified by California Waste Code) the quantity of waste, and how it was managed (treated, recycled, or disposed)[12].

The manifest system is designed as a "cradle to grave" system to ensure that wastes arrive at the destination the generator intended, and is designed to track the movement and ultimate disposition of hazardous waste. DTSC enters data from all manifest copies received into an automated data system known as the Hazardous Waste Tracking System (HWTS) database. Approximately half a million manifests are processed annually.

In building the HWTS, DTSC has chosen to put incomplete or erroneous information into HWTS rather than to defer imperfect data to a suspense file. This allows the completed information to be available for staff and research. The primary causes of data errors are as follows:

1. Errors or omissions made by generator or transporter or TSDF in completing their sections of manifests.
2. Key entry errors happen but less frequently. (Each manifest is double blind entered and checked if different). Primary causes of key entry errors are illegible handwriting and printing data on the line making it hard to read
3. Some ID numbers issued by U.S. EPA are not loaded into HWTS for 3 to 6 months. These new numbers would show as unknowns in the meantime.

Manifest Data Limitations

Interpreting manifest data depends on understanding and accounting for the limitations of this data set. Limitations pertinent to this analysis are listed below.

- This system tracks shipments. Increases in waste amounts do not necessarily equate to increased actual exposures or risk.

[12]A list of California Waste Code titles is contained in Appendix 4.

- The system tracks waste amounts, not concentration or chemical quantities. Large amounts of low-level contamination may give appearance of high hazard.
- There is potential for double-counting due to general system errors as well as when wastes are collected via milkrun[13] manifest to a transfer station, then shipped again from the transfer station to the treatment or disposal facility.
- The use of milkrun and modified manifests obscures the total number of hazardous waste generators (the total number of generators manifesting hazardous waste, will be undercounted due to this factor).[14]
- Aqueous hazardous wastes that are treated on a generator's site and subsequently disposed to a POTW (publicly owned treatment works) via an industrial sewer are excluded from these data. However, solid hazardous wastes, such as filter cake or sludge, generated as a result of on-site treatment are included in the data.
- Unit conversion factors may not adequately account for the variance in density of the range of wastes shipped.
- There is variability in the use of California Waste Codes when completing the manifest. This includes the inability to clearly discern site clean-up wastes from routinely-generated wastes (discussed in more detail later in this chapter).
- Changes in the definition of hazardous waste and/or the waste code system can affect trends analyses.
- Changes in compliance with manifest requirements can affect trends analysis.
- Improvements in DTSC's manifest tracking capabilities can affect trends analysis.
- Errors in filling out the manifest, or keying in the data can cause significant misreporting of quantities by the system.

Hazardous Waste to Treatment, Storage & Disposal Facilities, Including Transfer Stations: Potential to Double-Count Waste Amounts

Because the manifest system is designed to track shipments of hazardous waste, some waste quantities may be double-counted if wastes are sent to intermediate facilities prior to ultimate disposition. In this analysis, quantities that were identifiable as double-counted waste were subtracted from the total. Despite this, there remains some potential in this analysis to double-count some waste. This means that quantities of manifested waste may be overstated.

Data Entry Procedures

In a previous version of this report (September 2000), DTSC staff looked at data entry procedures to see whether they could have affected the analyses. Data entry procedures changed significantly between 1995 and 1996 and the new procedures ensured that from 1996 forward, the data are 99.95% accurate. Accuracy, in this context, refers to how accurate data entry personnel are in transferring the information from the actual manifest to the data system. The limitations inherent in the manifest system discussed earlier in this chapter still apply.

[13] "Milkrun" manifests are used by hazardous waste haulers to transport smaller amounts of wastes from numerous small quantity generators.

[14] As of 1/01/02, milkrun and modified manifests were combined into a new manifest called a "consolidated manifest." The number of waste streams allowable for shipment under this consolidated manifest is larger than that previously allowed under milkrun and modified manifests. This may result in future analyses of manifest data showing fewer generators of record, with larger volumes per generator.

Excluded Hazardous Waste
Numerous hazardous wastes, both RCRA and non-RCRA, were excluded from designation as hazardous waste between 1993 and 1998. Some of these exclusions were established in order to conform with existing exclusions at the federal level.

Appendix 2 contains a list of wastes that were excluded during the 1990's.[15] The rationales for excluding specific wastes vary. A waste may be excluded because new scientific research indicates that a substance is not as dangerous as previously thought. Another rationale would be to remove regulatory barriers to recycling hazardous wastes within a manufacturing process. Some wastes may be excluded because another agency is adequately regulating the waste. Because these excluded wastes do not correlate with the manifest codes, it is very difficult to evaluate the effect of these exclusions on trends in waste manifested. Such an analysis was deemed outside the scope of this report.

Biennial Report System Data
Hazardous waste generators are required under federal law to report, every two years, the total amount of hazardous waste generated during specific reporting years.

Biennial Report System Data Limitations
The federal Biennial Report System (BRS) data set includes only RCRA waste; non-RCRA waste is not included. Many waste types are excluded from this data set, most significantly, wastewater that is treated on site. Only large-quantity generators are required to report BRS data

Current Status of Hazardous Waste Generation in California

Biennial Generator Report Data

The total quantity of waste generated in California in 2003, as reported to this data set, was 445,317 tons. The top 10 generators of RCRA waste in 2003 are shown in Table 13a. The total quantity of waste generated in California in 2001, as reported to this data set, was 807,297 tons. The top 10 generators of RCRA waste in 2001 are shown in Table 13b. The total quantity of waste generated in California in 1999, as reported to this data set, was 427,302 tons. The top 10 generators of RCRA waste are shown in Table 13c.

There has obviously been significant turnover in the top ten generators as identified in the Biennial Report dataset. Only three generators remain on the 2003 list from the 1999 version. The top ten generators of 2003 accounted for reported nearly 70% as much waste (308,752 tons) as all reporting generators combined (445,317). The top ten generators in 2001 represented only 48% of the total waste reported while 1999's top ten accounted for 51% of that year's reported total.

[15] This list was developed for the last P2 workplan and was not updated for this report; therefore, it may not be complete.

Table 13a: Top Ten California RCRA Waste Generators in 2003 as Reported to the U.S. EPA Biennial Report System

Facility Name	City	Tons	% of Total
Onyx Environmental Services, L.L.C.	Azusa	46,289	15%
National California Envelope West	Chino	37,155	12%
Romic Environmental Technologies	East Palo Alto	22,752	7%
Ultima Circuits L.L.C.	Sacramento	19,552	6%
Golden West Refinery	Santa Fe Springs	15,313	5%
Shell Oil Products Martinez Refinery	Martinez	13,251	4%
Global Plating, Inc.	Fremont	11,945	4%
Kinsbursky Brothers Supply, Inc.	Anaheim	11,456	4%
Quemetco, Inc.	City of Industry	11,096	4%
Exide Technologies	Los Angeles	9,289	3%
Total for Top 10		**198,098**	**64%**
Total		**308,752**	**100%**

Source: The National Biennial RCRA Hazardous Waste Report for 2003 available at http://www.epa.gov/epaoswer/hazwaste/data/br03/state03.pdf See this document for additional detail.

Table 13b: Top Ten California RCRA Waste Generators in 2001 as Reported to the U.S. EPA Biennial Report System

Facility Name	City	Tons	% of Total
Brite Plating Co. Inc.	Los Angeles	265,205	33%
Valero Refining Company	Benicia	29,928	4%
Martinez Refining Company	Martinez	16,763	2%
Golden West Refining Company	Santa Fe Springs	14,971	2%
Pentagon Technologies	Hayward	13,903	2%
Kinsbursky Brothers, Inc.	Anaheim	11,387	1%
Quemetco, Inc.	City of Industry	11,339	1%
Pacific Resource Recovery Services	Los Angeles	9,273	1%
Pioneer Circuits, Inc.	Santa Ana	9,146	1%
Exide Technologies	Los Angeles	8,682	1%
Total for Top 10		**390,597**	**48%**
Total		**807,297**	**100%**

Source: The National Biennial RCRA Hazardous Waste Report available at http://www.epa.gov/epaoswer/hazwaste/data/brs01/state.pdf See this document for additional detail.

Table 13c: Top Ten California RCRA Waste Generators in 1999 as Reported to the U.S. EPA Biennial Report System

Facility Name	City	Tons	% of Total
Phibro-Tech, Inc.	Santa Fe Springs	71,999	17%
D/K Environmental	Vernon	26,228	6%
Los Angeles County/USC Med Center	Los Angeles	20,544	5%
Quemetco Inc.	City of Industry	19,343	5%
Safety-Kleen (San Jose), Inc.	San Jose	18,132	4%
Romic Environmental Technologies Corp.	East Palo Alto	16,086	4%
Martinez Refining Company	Martinez	13,865	3%
Kinsbursky Brothers	Anaheim	12,332	3%
GNB Technologies Inc.	Vernon	9,936	2%
Tamco	Rancho Cucamonga	9,836	2%
Total for Top 10		**218,301**	**51%**
Total		**427,302***	**100%**

Source: "The National Biennial RCRA Hazardous Waste Report available at http://www.epa.gov/epaoswer/hazwaste/data/brs99/. See this document for additional detail.
*Except for wastes disposed via deepwell/underground injection, U.S. EPA has excluded wastewater from the 1997 and 1999 National Biennial Reports. This quantity therefore does not include aqueous hazardous wastes treated on-site prior to discharge to a publicly owned treatment works; nor does it include such aqueous wastes sent off-site for treatment and disposal.

Hazardous Waste Manifest Tracking System Data

All hazardous wastes, both RCRA and non-RCRA, are manifested in California according to California Waste Codes (CWC). As discussed in the previous chapter, these codes range from somewhat specific to very general. The range of materials that are actually manifested in any given California Waste Code may vary widely from facility to facility or within a single facility over time. Table 14 gives some examples to illustrate the kinds of wastes that are classified within some of the commonly used California Waste Codes.

Table 14: Examples of Wastes Transported Under California Waste Codes

CWC	Waste Code Descriptor	Example Waste Streams
123	Unspecified alkaline solution	ammonium copper chloride, ammonium hydroxide sodium hydroxide copper tetreamine dichloride
135	Unspecified aqueous solution	Non-RCRA hazardous waste liquid, (non-DOT regulated) hazardous waste liquid NOS ("not otherwise specified"), (cadmium, silver) (chromium, zinc) non-RCRA Hazardous waste liquid NOS, (water, oil)
162	Other spent catalyst	Non-RCRA hazardous waste, solid (spent catalyst) (spent nickel moly catalyst) self-heating solid, inorganic, NOS (spent catalyst w/arsenic)
181	Other inorganic solid waste	environmentally hazardous waste substance solid NOS (nickel, cadmium) hazardous waste solid, NOS, (mercury) (fluorescent light tubes) (steel and garnet blast)
214	Unspecified solvent mixture	waste flammable liquid, NOS (lead, petroleum distillates) (toluene, xylene) (methanol, toluene) waste paint-related material
223	Unspecified oil-containing waste	Non-RCRA hazardous waste liquid (oil and water) (mop and deburring water) waste flammable liquid, NOS (gasoline, jet fuel, crude oil)
252	Other still bottom waste	MEK, chromium Non-RCRA hazardous waste liquid, still bottoms Non-RCRA hazardous waste, liquid paint solids with toluene, xylene
343	Unspecified organic liquid mixture	hazardous waste liquid NOS (ethylene glycol) waste styrene monomer, inhibited waste flammable liquid, corrosive NOS, (alpha picoline) hazardous waste liquid NOS (benzene, tetrachlorethylene)
352	Other organic solids	Non-RCRA hazardous waste, solid (rags w/soil and oil) (oily debris)
491	Unspecified sludge waste	hazardous waste solid NOS, (cadmium, chromium) wastewater screenings, filtercake and phosphate sludge, non-hazardous waste solid non-RCRA hazardous waste, solid (filter cake, baghouse debris)

For the top twenty waste streams (by quantity), Table 15 shows the relative contribution of each California Waste Code to the total recurrent wastes manifested in 2002. Over 90% of the recurrent waste manifested in California is accounted for by the top twenty waste codes.

Table 15: Percent of Recurrent Waste Manifested, by Waste Code 2004

Percent of Recurrent Waste Manifested, by Waste Code, 2004

CWC	Waste Type (California Waste Code) Description	Tons	% of Recurrent Waste
221	Waste oil and mixed oil	442,510.6	32%
181	Other inorganic solid waste	266,528.0	19%
352	Other organic solids	123,896.2	9%
512	Other empty containers 30 gallons or more	71,101.43	5%
***	Invalid waste code	70,346.55	5%
223	Unspecified oil-containing waste	49,115.45	4%
134	Aqueous solution with total organic residues less than 10	36,430.02	3%
132	Aqueous solution with metals (< restricted levels and see 121)	29,118.97	2%
135	Unspecified aqueous solution	25,509.99	2%
222	Oil/water separation sludge	24,013.32	2%
343	Unspecified organic liquid mixture	23,357.63	2%
421	Lime sludge	23,249.49	2%
171	Metal sludge (see 121)	19,823.31	1%
741	Liquids with halogenated organic compounds >= 1,000 Mg./L	15,935.64	1%
133	Aqueous solution with total organic residues 10 percent or	15,366.70	1%
	Blank or unknown	14,644.13	1%
214	Unspecified solvent mixture	14,074.75	1%
792	Liquids with pH <= 2 with metals	12,739.35	1%
591	Baghouse waste	12,403.07	1%
491	Unspecified sludge waste	12,205.36	1%
	Total for 20	1,302,370	93%
	Recurring Wastes	1,395,055	100%

Waste oil (California Waste Code 221, waste oil & mixed oil) dominates recurrent wastes, contributing 32% of the total amount of recurrent waste in California, followed by other inorganic solids at 19% and other organic solids at 9%. It is important to note that, historically, less than 40% of manifested used oil is treated by re-refining or distillation, despite being considered “recycled”. The balance of used oil is blended with other materials and consumed as fuel oil. The significant environmental impacts from used oil-derived fuels and the need to support the addition of treatment capacity is outlined in a recent life-cycle assessment report (Environmental Science and Technology, v38 n2). The next largest waste stream is California Waste Code 181 (Other Inorganic Solid Waste), at 19% of the total. For comparison purposes, these percentages were 33% and 14%, respectively, in 1998.

When shipping hazardous wastes under a manifest, generators must include a designation of the type of waste management method that will be used at the final destination. An understanding of existing waste management strategies is essential for understanding hazardous waste issues. In 2004, recycling was the most prevalent method for managing hazardous waste in California, accounting for 38% of the manifested waste total, with land disposal following at 22%. Treatment accounts for 6%

of the total and incineration only 1%.Table 16 shows each management method's relative percentage of the total.

Table 16: Hazardous Waste Management Methods in California, 2004 Manifest (Recurrent Wastes)

Method	Hazardous Mgmt Code	Tons of	%Man-aged
Recycler	R01	530,9	38%
Disposal, landfill	D80	310,5	22%
		276,1	20%
Transfer station	H01	143,1	10%
Treatment, tank	T01	76,06	6%
Disposal, other	D99	28,66	2%
Treatment, incineration	T03	13,97	1%
Invalid disposal code	***	785	0%
Disposal, Land application	D81	93	0%
Disposal, surface impoundment	D83	59	0%
Disposal, injection well	D79	24	0%
Treatment, surface impoundment	T02	1	0%
Total		1,380	100%

Transfer stations accounted for 10% of the total wastes managed in 2004. The majority of the wastes being received by transfer stations is waste oil (California Waste Code 221), which usually is designated as recycled (which includes blending and burning as fuel for energy recovery).

Hazardous Wastes Shipped Out Of State

Out-of-state waste shipments are tracked under the manifest system of the State receiving the waste. Not all States, however, maintain their own manifest tracking system. Hazardous wastes sent from California to one of these States (without a tracking system) are tracked under California's manifest system. The invalid "method" in Table 16 may represent wastes shipped out of State. DTSC would not necessarily receive the copy of the manifest, which shows management methods from out-of-state treatment, storage or disposal facilities.

Hazardous Waste Management - Disposal

Table 17 shows the top five industry types disposing hazardous wastes to landfill[16]. After the 34% of the waste is not associated with an SIC Code, the petroleum refining industry is the largest generator of recurrent hazardous waste, at 11% of the total.

Table 17: Top 25 Industry Types Disposing to Landfill, 2004 Manifest

Top 25 Industry Types Disposing to Landfill, 2004 Manifest

SIC	Standard Industrial Classification Description	Tons	%
	Blank	125,631	34%
32411	Petroleum Refineries	42,065	11%
54171	Research and Development in the Physical, Engineering, and Life	27,371	7%
22112	Electric Power Transmission, Control, and Distribution	21,113	6%
32519	Other Basic Organic Chemical Manufacturing	20,523	6%
482111	Line-Haul Railroads	9,220	2%
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	7,245	2%
325188	All Other Basic Inorganic Chemical Manufacturing	6,340	2%
334613	Magnetic and Optical Recording Media Manufacturing	4,901	1%
92119	Other General Government Support	4,313	1%
211111	Crude Petroleum and Natural Gas Extraction	4,228	1%
221122	Electric Power Distribution	4,085	1%
22131	Water Supply and Irrigation Systems	3,447	1%
32552	Adhesive Manufacturing	3,246	1%
48839	Other Support Activities for Water Transportation	3,227	1%
92811	National Security	3,176	1%
331221	Rolled Steel Shape Manufacturing	3,085	1%
324199	All Other Petroleum and Coal Products Manufacturing	2,938	1%
336411	Aircraft Manufacturing	2,569	1%
331316	Aluminum Extruded Product Manufacturing	2,426	1%
22121	Natural Gas Distribution	2,265	1%
3364	Aerospace Product and Parts Manufacturing	2,047	1%
334412	Bare Printed Circuit Board Manufacturing	1,957	1%
333295	Semiconductor Machinery Manufacturing	1,914	1%
327213	Glass Container Manufacturing	1,904	1%
	Total for Top 25	311,235	84%
	Total	370,476	100%

In 2004, the largest recurrent waste stream manifested for landfill disposal was California Waste Code 181 (other inorganic solid waste), accounting to 52% of the total recurrent waste going to landfill disposal Table 18 below lists the top waste codes, representing 97% of the total material going to landfills.

[16] The tables in this chapter show only what appear to be the significant industries or facilities; therefore, the number of industries or facilities shown may vary from table to table.

Table 18: Top 15 Waste Codes to Landfill, 2004 Manifest

Top 15 Waste Codes to Landfill, 2004

CWC	California Waste Code	Tons	%
181	Other inorganic solid waste	161979.7	52%
	Blank	59609.37	19%
352	Other organic solids	46293.72	15%
223	Unspecified oil-containing waste	7488.656	2%
591	Baghouse waste	3160.095	1%
491	Unspecified sludge waste	3041.322	1%
512	Other empty containers 30 gallons or more	3019.464	1%
441	Sulfur sludge	2293.658	1%
421	Lime sludge	2245.719	1%
792	Liquids with pH <= 2 with metals	2196.283	1%
272	Polymeric resin waste	1981.703	1%
751	Solids or sludges with halogenated organic compounds >= 1,000	1774.012	1%
171	Metal sludge (see 121)	1723.275	1%
162	Other spent catalyst	1676.078	1%
513	Empty containers less than 30 gallons	1667.931	1%
	Total for Top 15	300151.0	97%
	Total	310550.9	100.0

Table 19: Top 15 Facilities to Landfill, 2004 Manifest

Top 15 Facilities to Landfill, 2004 Manifest

Facility Name	County	Tons	%
CURTIS PARK VILLAGE	Sacrament	47,21	15
SHELL CHEM LP-MARTINEZ CATALYST PLANT	Contra	20,52	7%
CARLSON BLVD LP C/O THE JOHN STEWART CO	Contra	16,09	5%
SHELL OIL PRODUCTS/US MARTINEZ REFINERY	Contra	10,87	4%
UNION PACIFIC RAILROAD	Sacrament	8,920	3%
TESORO REFINING & MARKETING CO.	Contra	7,721	2%
CONOCO PHILLIPS	Contra	6,480	2%
FORMER PENINSULA SPORTSMENS CLUB	San Mateo	5,947	2%
EXXON MOBIL OIL CORP	Los	5,729	2%
SALTON SEA POWER L P AND BRINE L P	Imperial	5,168	2%
CALTRANS DIST 11/CONSTR/EA 11-247304	San Diego	4,574	1%
VULCAN POWER PLANT	Imperial	3,849	1%
LEATHERS POWER PLANT	Imperial	3,846	1%
CALENERGY MINERALS LLC	Imperial	3,696	1%
HONEYWELL	Los	3,476	1%
Total for Top 15		154,1	50
Total		310,5	100

Table 19 presents a listing of the largest quantity generators sending material to land disposal. The top fifteen includes five refineries and four power plants. The largest generator, Curtis Park Village represents non-recurrent clean-up waste.

Hazardous Waste Management: Incineration

Environmental and public health advocates are particularly concerned about hazardous waste incineration, largely because of the byproducts that can be released during combustion processes. If not properly controlled, these byproducts can include dioxins and other highly toxic materials.

Tables 20, 21 and 22 below show the industries, waste types, and facilities involved in hazardous waste incineration.

Table 20: Top 16 Industry Types to Incineration, 2004 Manifest

Top 16 Industry Types to Incineration, 2004

NASIC	NA SIC Description	Ton	%
336411	Aircraft Manufacturing	4,90	21
54171	Research and Development in the Physical,	4,32	19
32411	Petroleum Refineries	2,63	11
	Blank	1,76	8%
48839	Other Support Activities for Water Transportation	1,76	8%
3364	Aerospace Product and Parts Manufacturing	760	3%
32532	Pesticide and Other Agricultural Chemical	731	3%
22112	Electric Power Transmission, Control, and	702	3%
325412	Pharmaceutical Preparation Manufacturing	636	3%
92811	National Security	540	2%
336211	Motor Vehicle Body Manufacturing	506	2%
2211	Electric Power Generation, Transmission and	428	2%
61131	Colleges, Universities, and Professional Schools	272	1%
325211	Plastics Material and Resin Manufacturing	253	1%
999999	Not Otherwise Specified	216	1%
332999	All Other Miscellaneous Fabricated Metal Product	166	1%
	Total for Top 16	20,6	89
	Total	23,2	100

Table 21: Top 14 California Waste Codes to Incineration, 2004 Manifest

Top 15 California Waste Codes to Incineration, 2004

CWC	California Waste Code Description	Ton	%
352	Other organic solids	4,86	35
491	Unspecified sludge waste	845	6%
181	Other inorganic solid waste	824	6%
331	Off-specification, aged or surplus organics	698	5%
132	Aqueous solution with metals (< restricted levels and see 121)	673	5%
222	Oil/water separation sludge	578	4%
343	Unspecified organic liquid mixture	514	4%
241	Tank bottom waste	452	3%
731	Liquids with polychlorinated biphenyls >= 50 Mg./L	447	3%
221	Waste oil and mixed oil	446	3%
741	Liquids with halogenated organic compounds >= 1,000 Mg./L	425	3%
214	Unspecified solvent mixture	320	2%
751	Solids or sludges with halogenated organic compounds >= 1,000	300	2%
461	Paint sludge	296	2%
212	Oxygenated solvents (acetone, butanol, ethyl acetate, etc.)	270	2%
	Total for Top 15	11,9	86
	Total	13,9	100

Table 22: Top 20 Facilities to Incineration, 2004 Manifest

Top 20 Facilities to Incineration

Facility Name	County	Ton	%
NORTHROP GRUMMAN CORP (WC)	Los Angeles	1,51	11
PACIFIC GAS & ELECTRIC -DIABLO CYN	San Luis	666	5%
THE DOW CHEMICAL COMPANY	Contra Costa	642	5%
LOCKHEED MARTIN AERONAUTICS COMPANY	Los Angeles	563	4%
NORTHROP GRUMMAN CORP	Los Angeles	526	4%
VALERO REFINING COMPANY-CALIF	Solano	496	4%
CHEVRON 1001651-EL SEGUNDO REFINERY	Los Angeles	451	3%
TESORO REFINING & MARKETING CO.	Contra Costa	420	3%
AMERICAN REMANUFACTURERS INC	Orange	396	3%
NATIONAL STEEL AND SHIPBUILDING CO	San Diego	385	3%
VOUGHT AIRCRAFT INDUSTRIES INC	Los Angeles	327	2%
SHELL OIL PRODUCTS US	Kern	297	2%
US NAVY PUBLIC WORKS CENTER	San Diego	295	2%
STRINGFELLOW PRETREATMENT PLANT	Riverside	256	2%
BP WEST COAST PRODUCTS LLC	Los Angeles	248	2%
COOK COMPOSITES AND POLYMERS CO	Ventura	234	2%
PACIFIC GAS & ELECTRIC CORPORATION	Alameda	229	2%
UNITED TECHNOLOGIES PW SPACE PROPULSION	Santa Clara	211	2%
AEROJET FINE CHEMICALS, LLC	Sacramento	189	1%
NEW UNITED MOTOR MANUFACTURING INC	Alameda	169	1%
Total for top 20		8,51	61
Total		13,9	100

Which facilities manifested the most waste?

Table 23 below shows the 17 largest-quantity hazardous waste generators as identified in the manifest data system for 2004. Note that several of the companies are also "off-site facilities." Such facilities are those that accept waste generated elsewhere for treatment and disposal. Generally, such facilities were excluded from these analyses to avoid double-counting the waste. For this table, however, wastes manifested under these facilities' EPA identification number for permitted activities were excluded. The quantities listed here were manifested under a different EPA ID number and may reflect activities associated with milk-run transporter activities.

Table 23: 17 Largest Quantity Generators, 2004 Manifest

17 Largest Quantity Generators, 2004 Manifest

Facility name	County	Tons	%
PORT OF OAKLAND	Alameda	65,083	5%
ASBURY ENVIRONMENTAL SERVICES	Los Angeles	55,852	4%
CURTIS PARK VILLAGE	Sacramento	47,210	3%
EVERGREEN ENVIRONMENTAL SERVICES	Alameda	35,821	3%
ASBURY ENVIRONMENTAL SERVICES	Los Angeles	35,326	3%
ASBURY ENVIRONMENTAL SERVICES	Los Angeles	27,324	2%
CLEARWATER ENV MGMT DBA ALVISO INDEPENDENT	Santa Clara	26,395	2%
GH CAPITOL	Los Angeles	24,200	2%
EVERGREEN ENVIRONMENTAL SERVICES	Alameda	23,576	2%
ARAMARK UNIFORM SERVICES	Los Angeles	20,789	2%
SHELL CHEM LP-MARTINEZ CATALYST PLANT	Contra Costa	20,522	1%
PG&E TOPOCK COMPRESSOR BLM GW EXTRACTION	San	18,285	1%
CARLSON BLVD LP C/O THE JOHN STEWART CO	Contra Costa	16,097	1%
CLEARWATER ENVIRONMENTAL MGMT	Alameda	14,484	1%
SAN JOAQUIN FILTER RECYCLING	Fresno	13,622	1%
CERRO METAL PRODUCTS CO	Los Angeles	13,529	1%
RIVERBANK OIL TRANSFER, LLC	Stanislaus	11,997	1%
Total for Top 17		470,11	34
Total		1,380,	100

Conclusion

In conclusion we will briefly revisiting the four questions that this part of the report focused on:

What hazardous wastes were generated?

A review of this chapter indicates that the majority of the hazardous waste manifested in California consists of oil and oil-contaminated waste; and organic and inorganic solids. Furthermore, the data indicate that a significant portion of the hazardous waste manifested in the State is directly or indirectly related to the production, maintenance, operation and disposal of the automobile. Waste oil and oil-contaminated waste

constitute over a third of all manifested waste. DTSC Life Cycle Analysis (LCA) staff estimated that used oil from the transportation sector could be reduced to half the current volume by the widespread use of high-efficiency oil filtration systems that give longer intervals between oil changes (e.g., over 10,000 miles rather than the average 4800 miles for passenger cars). These filters are commercially available for the larger vehicle classes, although their use in light duty vehicles is less common. Efforts to educate the public and advocate that vehicle manufacturers install these filters are needed to address this growing and resource-intensive waste stream.

What industries generated hazardous waste?

The environmental services (hazardous waste treatment, storage, and disposal) industry, petroleum refining industry, and power generation industry remain among the largest volume generators. However, the universe of generators exhibits a tremendous diversity in type, and size of industries contributing to the overall hazardous waste generation picture.

How was the hazardous waste managed?

Recycling is the predominant management approach for hazardous waste in California (38%), followed by land disposal (22%), treatment (6%) and incineration (1%).

Which facilities generated the largest amounts of hazardous waste?

The largest hazardous waste generating “facilities” constitute a diverse group hazardous waste including the Port of Oakland, environmental services (hazardous waste treatment, storage, and disposal) facilities, petroleum refining facilities, power generation facilities, cleanup sites, etc.

Remember, however, that environmental problems cannot be directly correlated to hazardous waste amounts. In fact, the wastes reported to the manifest and BGR data sets are those that are properly managed and controlled; presumably, these quantities represent materials that do not cause harm, or cause less harm, because they are not released uncontrolled into the environment. However, regardless of the risk or environmental problems, proper hazardous waste management continues to pose a formidable challenge.

Part IV:
Trends and Current Status of Hazardous Waste Generation from Manifest, and Biennial Report System Data in California: 1996-2004

Introduction

An understanding trends in California's generation of hazardous is essential to designing an effective P2 program. To further this understanding, DTSC staff reviewed available environmental data as well as some relevant econometric data. DTSC intends to continue to improve and refine its data analysis capabilities over the next two years with the expectation that these will prove increasingly valuable in planning future program priorities and directions.

Two databases, (discussed in more detail in Part III) were used for this analysis: the hazardous waste manifest tracking system (HWTS), and Biennial Generator System (BRS) data. These data sets report on different aspects of hazardous wastes and materials. HWTS data reflect off-site hazardous waste management and are based on information contained in shipping documents known as California Uniform Hazardous Waste Manifests (manifests). The federal Biennial Generator System includes hazardous waste data collected from generators[17] every two years, as the name suggests. In this reporting system, generators report quantities of Resource Conservation and Recovery Act (RCRA) hazardous waste generated – that is, waste that is hazardous under the federal regulatory system. A large percentage of waste manifested in California, perhaps over 50%, is non-RCRA waste. Non-RCRA wastes are designated hazardous because of California's more stringent hazardous waste classification scheme.

The purpose of this analysis is twofold: to examine hazardous waste trends over time and to evaluate pollution prevention progress in California. One important point needs to be made before looking at this information: none of the data sets allows an assessment of total hazardous waste generated. The most significant reason is that none of the data sets captures quantities of hazardous wastewater that are treated onsite and sent to a publicly owned treatment works. Therefore, it is not possible to determine the total amount of hazardous waste generated in California. While we cannot state that manifested waste trends correlate exactly with total waste generated, those trends must serve as surrogates for total waste generation because total waste quantities remain unknown.

[17] The term "generator" will be used throughout this analysis to describe businesses or public sector entities that produce hazardous waste.

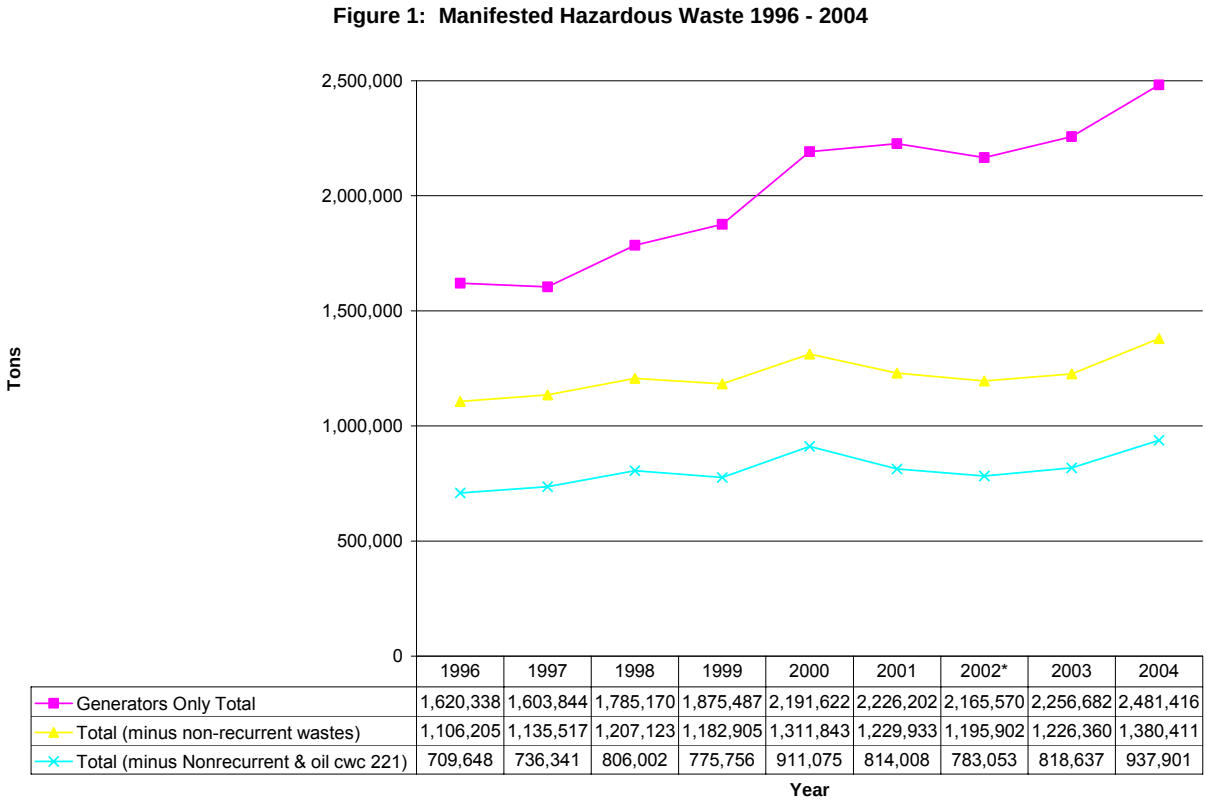
HWTS Data

Data from DTSC's HWTS database were used to evaluate trends in hazardous waste manifested from generators. This database captures both RCRA and non-RCRA hazardous waste from all generators. The evaluation initially looks at trends in total annual manifested hazardous waste, then systematically subtracts nonrecurrent waste and potentially double-counted wastes to maintain a focus on routinely-generated wastes.

Trends in Total Hazardous Waste Manifested

The top line in Figure 1 shows the total amount, in tons, of hazardous waste manifested in California from 1996 through 2004.[18] The upward trends that apparently began by 1997 have continued. The total amount of hazardous waste manifested in 2004 was approximately 46%[19] greater than that in 1996.

Figure 1: Manifested Hazardous Waste 1996-2004



	1996	1997	1998	1999	2000	2001	2002*	2003	2004
Generators Only Total	1,620,338	1,603,844	1,785,170	1,875,487	2,191,622	2,226,202	2,165,570	2,256,682	2,481,416
Total (minus non-recurrent wastes)	1,106,205	1,135,517	1,207,123	1,182,905	1,311,843	1,229,933	1,195,902	1,226,360	1,380,411
Total (minus Nonrecurrent & oil cwc 221)	709,648	736,341	806,002	775,756	911,075	814,008	783,053	818,637	937,901

Recurrent Waste Trends

"Nonrecurrent" waste quantities were subtracted from the total to derive the middle trend line in Figure 1. Nonrecurrent wastes are those that are not routinely generated;

[18] To the extent the data allow, these quantities were adjusted to eliminate double counting of manifested wasted handled at an off-site treatment, storage, or disposal facility where it might be shipped for some subsequent handling and/or disposal.
[19] Percentages have been rounded to the nearest whole number.

they are hazardous wastes that come from operations such as contaminated site cleanups, removing PCB-contaminated equipment, and removing asbestos. "Household hazardous waste" was included in this category, in order to focus on commercial and industrial hazardous waste generation. Recurrent waste, then, is the total quantity of manifested waste minus non-recurrent waste.[20]

Recurrent manifested waste increased approximately 25% from 1996 to 2004 from 1,106,2054 tons in 1996 to 1,380,411 tons in 2004. As seen in Figure 1, total recurrent waste manifested has exhibited an overall upward trend from 1996 to 2004. Figure 1 also shows manifested recurrent waste minus waste oil and mixed oil (bottom line), to more accurately indicate waste generated from the industrial and commercial sectors. The 2004 quantity of 937,901 is about 24% more than the 709,648 tons reported in 1996.

To more closely evaluate the trends in manifested waste, the waste types were grouped, by California Waste Code, into seven categories: inorganics, organics, solids, miscellaneous, California Restricted Waste,[21] nonrecurrent waste, and "invalid, unknown, or blank." Figure 2 illustrates the trends for these waste groups.

From 1996 to 2003, the "organics" group exhibited an overall increasing trend with a significant decrease between 2003 and 2004. When looking at this result, remember that this waste group includes waste oil/mixed oil, the largest single hazardous waste stream generated. Waste oil/mixed oil has historically constituted almost 60% of the total organics waste group.

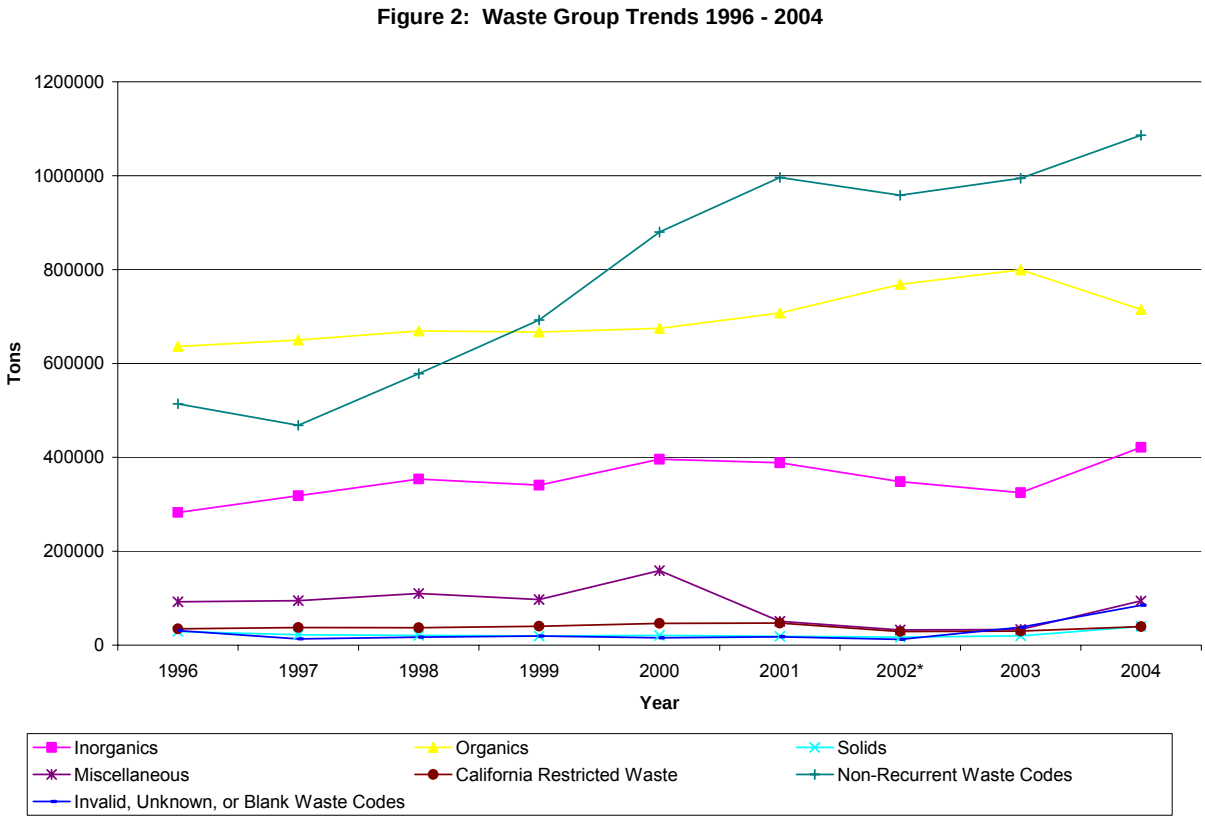
"Solids" and California Restricted Waste relatively stable between 1996 and 2004. The "invalid, unknown or blank" category and the "miscellaneous" category which had both remained stable between 1996 and 2003 increased significantly between 2003 and 2004.

[20] Wastes included in the non-recurrent category include California Waste Codes (CWC):

151	asbestos-containing waste,
261	polychlorinated biphenyls and material containing PCBs,
611	contaminated soil from site clean-up, and
612	household hazardous waste

[21] "Restricted" wastes cannot be landfilled unless they are treated to certain specifications.

Figure 2: Waste Group Trends, 1996-2004



The inorganics waste group demonstrated an overall upward trend from 1996 through 2004 (see Figure 2 and Table 24). One waste type, "other inorganic solid waste" (California Waste Code 181) accounted for most of the increase. California Waste Code 181 is also notable in that it is one of only a few waste streams that have increased steadily and significantly over time

Table 24: CWC 181 Waste Trends

	1996	1997	1998	1999	2000	2001	2002*	2003	2004
Tons CWC 181	125,534	150,043	170,904	183,944	228,160	230,831	225,207	204,504	266,528
% CWC 181 of recurrent waste	11%	13%	14%	16%	17%	19%	18%	16%	19%

Finally, note that California Waste Code 181 is an increasing and significant percentage of total recurrent waste (Table 25 below). Table 25 lists the top twenty five generators of CWC 181 waste, by quantity, exclusive of permitted treatment, storage or disposal facilities. Unfortunately, it has come to our attention that the system reliability issues, combined with very significant errors in completion of manifests for 181 waste may

account for the apparent increase in 181 waste. Further review and analysis, along with improvements in system reliability and manifest usage, will be necessary in order to adequately evaluate 181 waste trends.

Table 25: Top 25 Generators of CWC 181

US EPA ID No	Facility Name	Waste Code	Tons
CAC002573934	GH CAPITOL	181	24199.83
CAR000015313	SHELL CHEM LP-MARTINEZ CATALYST PLANT	181	20369.87
CAC002578288	CARLSON BLVD LP C/O THE JOHN STEWART CO	181	16157.32
CAD981448764	AVIBANK MANUFACTURING INC	181	10147.91
CAD009164021	SHELL OIL PRODUCTS/US MARTINEZ REFINERY	181	9450.104
CAD983663600	SALTON SEA POWER L P AND BRINE L P	181	6916.017
CAR000150615	FORMER PENINSULA SPORTSMENS CLUB	181	6052.99
CAD983648403	LEATHERS POWER PLANT	181	5968.427
CAD983648429	VULCAN POWER PLANT	181	5866.763
CAD009108705	CONOCO PHILLIPS	181	5641.509
CAD008237679	TOSCO REFINING CO	181	5120.259
CAR000104885	Honeywell	181	4845.455
CAC002582891	CALTRANS DIST 11/CONSTR/EA 11-247304	181	4573.876
CAD983648445	ELMORE POWER PLANT	181	3548.301
CAD008378044	DOUGLAS AIRCRAFT CORP	181	3418.496
CAD982510497	COSO OPERATING CO	181	3168.928
CAD063001770	VALERO REFINING COMPANY-CALIF	181	2821.11
CAD009146929	OWENS-BROCKWAY GLASS CONTAINER INC	181	2708.643
CAD053240560	PPG INDUSTRIES INC/WORKS 15	181	2444.12
CAR000151837	CCSF-DPW OCTAVIA BLVD.	181	2336.242
CAD982523896	INDALEX WEST INC	181	2091.587
CAD008336901	CHEVRON 1001651-EL SEGUNDO REFINERY	181	2084.233
CAC002570088	MISSION STEUART HOTEL PARTNERS, LLC	181	2078.345
CAT080011521	GEYSERS POWER COMPANY, LLC	181	2058.882
CAL000213100	PORT OF OAKLAND	181	1972.995

Nonrecurrent waste trends will be discussed in more detail later in this chapter.

Number of Generators

The number of hazardous waste generators (Table 26) manifesting waste has not increased since 2000, and in fact, has declined significantly over the past several years. Remember that, because of milkrun and modified manifesting options, these numbers are understated. In addition, more waste types are now eligible for

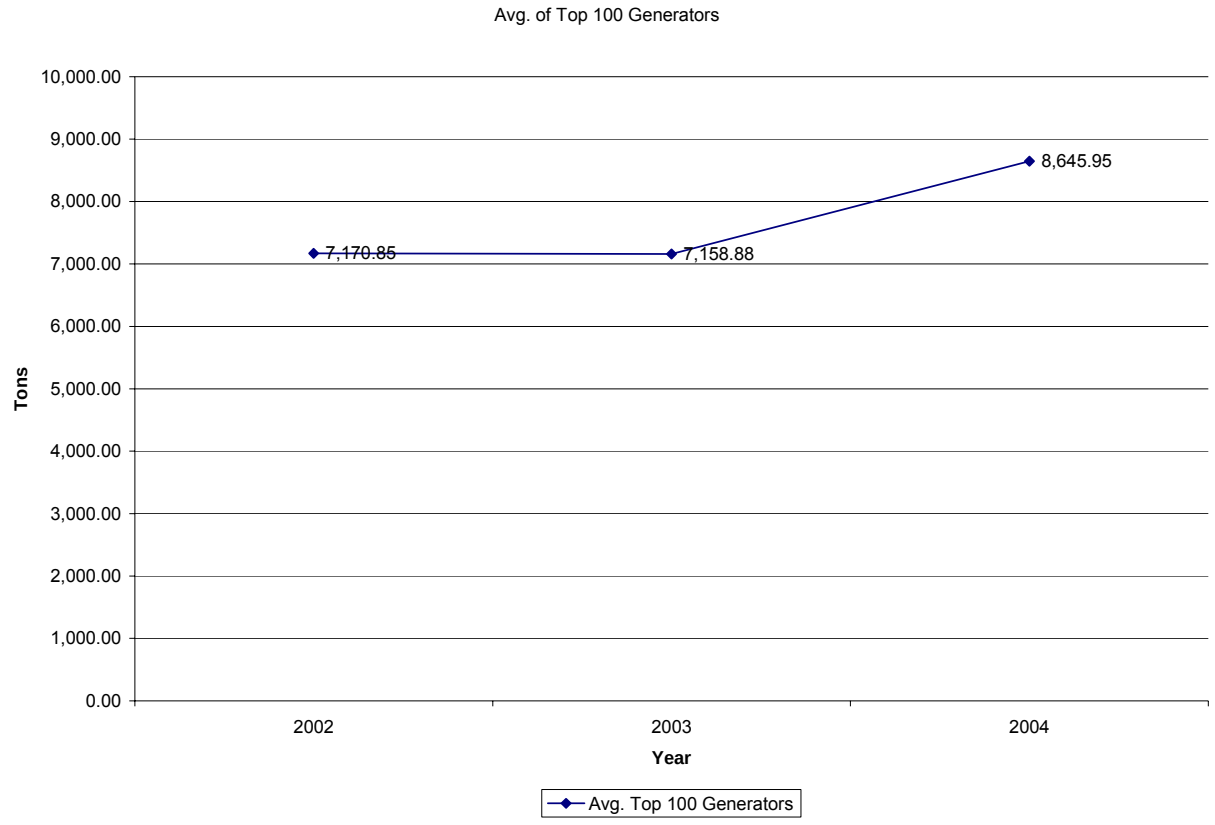
Table 26: Changes in the Number of Generators, 2000 to 2004

Year	Number of Generators
2000	63,000
2001	56,852
2002*	56,632
2003	55,786
2004	55,026

milkrun manifesting, further reducing the system's ability to accurately identify all hazardous waste generators.

Trends for Generators Manifesting Large Quantities of Recurring Waste
The "top one hundred" entities manifest about 60% of the total recurring waste. Figure 3 clearly shows an increase in the average quantity, per generator, of hazardous waste manifested by these 100 generators. (Note that the "top 100" generators from any one year are not necessarily the same facilities that were the "top 100" in any other year. A determination of which facilities reappear from year to year was not made for this report.

Figure 3: Average Tons per 100 Largest-Volume Generators

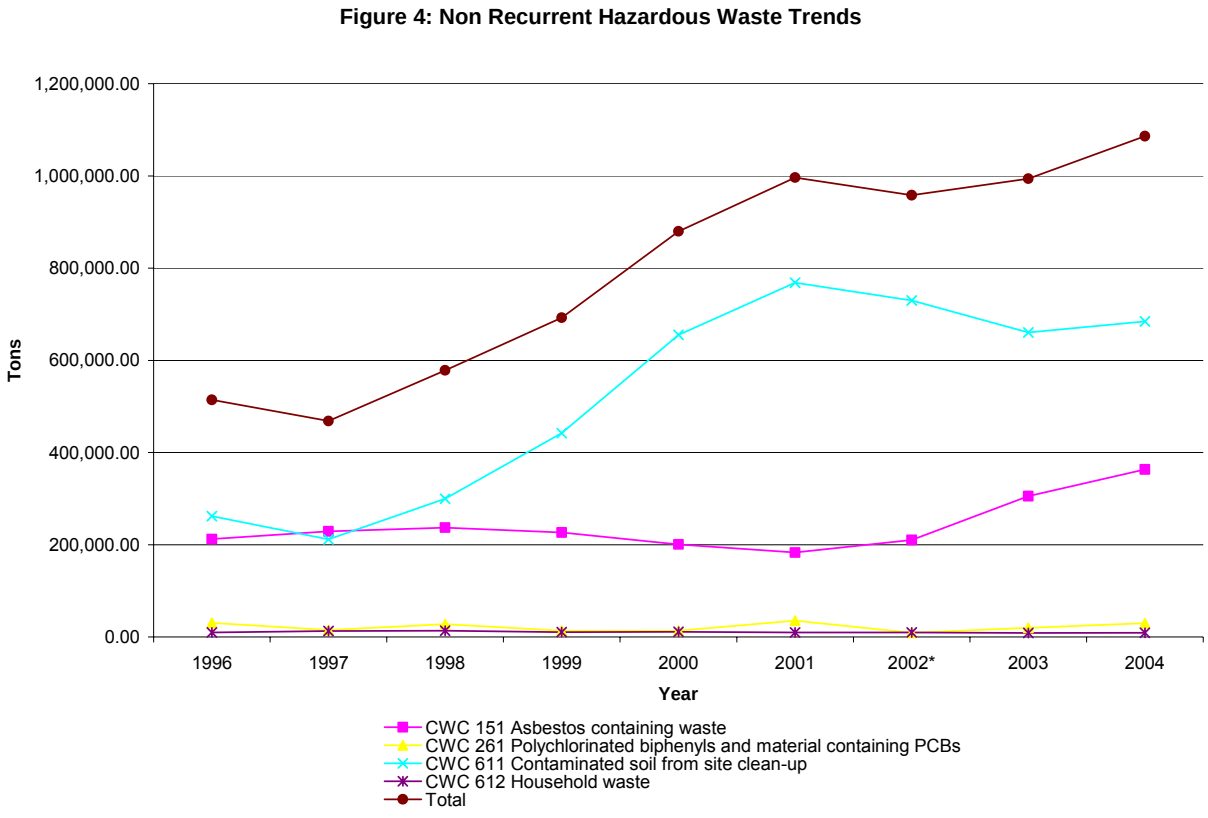


Trends for Generators Manifesting Small Quantities of Hazardous Waste
Trends for recurrent waste from entities that manifest smaller amounts of hazardous waste are more difficult to ascertain given the limitations of the data. This is primarily because we cannot determine with precision the total number of entities generating waste (largely due to milkrun and modified manifesting procedures

Waste Oil and Mixed Oil
"Waste oil and mixed oil" (California Waste Code 221) is consistently a significant portion of California's total amount of manifested recurrent waste. The percentage of waste/mixed oil manifested relative to the recurrent total was about 32% in 2004. "Waste oil and mixed oil" is California's largest waste stream.

Nonrecurrent Waste and Contaminated Soil
Nonrecurrent waste is a significant portion of total hazardous waste manifested. These wastes increased by over 100% from 1996 to 2004, dropping slightly between 2001 and 2002 and apparently resuming its upward trend since 2002 Figure 4 below indicates that contaminated soil from site cleanup (California Waste Code 611) was also increasing through 2001, and accounts for much of the increase (and subsequent decrease) in non-recurrent wastes. The overall upward trend in site clean-up waste is a positive trend, because it reflects efforts to remediate contaminated properties for re-use, and prevents possible groundwater contamination.

Figure 4: Nonrecurrent Hazardous Waste Trends



These data may undercount the quantity of hazardous waste generated from site clean-up activities. While there is a California Waste Code for "contaminated soil," other wastes generated during clean-up activities may be manifested under other waste codes, making it difficult to assess the total quantity of wastes generated due to clean-

up activities. For example, some portion of California Waste Code 181, "other inorganic solid waste," may consist of site remediation waste that is not contaminated soil.

Several factors contribute to the increase in contaminated soil and clean-up waste:

- DTSC's Site Mitigation Program oversees many hazardous waste site clean-ups, including Brownfield remediation, voluntary clean-ups, and school site remediations. In addition, approximately 2,000 cleanups of clandestine labs occur per year, contributing to the total quantity of hazardous waste generated in California (although there may be little contaminated soil generated in these clean-ups).

- AB 2784 (Strom-Martin, Chapter 326, Statutes of 1998) specifies that no waste that contains total lead in excess of 350 parts per million may be disposed to land other than a Class I hazardous waste disposal facility. This includes waste that is not a hazardous waste but that contains lead with a total concentration exceeding 350 parts per million. This bill significantly restricted options for managing lead-contaminated soil, and has probably resulted in increased disposal of such soil as hazardous waste.

This discussion is significant because it illustrates the concept of "beneficial" hazardous waste generation. For example, when a facility replaces its light ballasts with energy-efficient ones, there is a short-term increase in hazardous waste generation; the environmental benefits of the activity are realized over a longer time frame. In addition, the environmental benefits of these activities are much broader than those related specifically to hazardous waste generation. For example, the environmental benefits of a widespread conversion to energy-efficient lighting systems will result in air quality improvements, reduced need for energy generation, and reduced costs for consumers. The benefits of increased site clean-up activity are also widespread. Rehabilitation of urban properties can reduce exposures of residents to contaminated properties. Such redevelopment has additional benefits, in that it can reduce the need to consume previously-undeveloped land at the edges of urban areas, reduce car and truck traffic, can reduce the need to extend city services such as sewers, and so on.

Biennial Report System Data

Historic Biennial Report System data are considered unreliable; therefore, we will only attempt to compare the 1997, 1999, 2001, and 2003 data (Table 27). According to U.S. EPA's latest evaluation of these data, which only includes reported RCRA nonaqueous waste, California ranks sixteenth in the nation with regard to total waste manifested (445,317 tons of RCRA waste). Although California has 14.2% of the nation's total RCRA waste generators, it manifested 1.5% of the nation's total RCRA waste, up significantly down from 2.0% in 2001.[22]

[22] EPA Executive Summary, The National Biennial RCRA Hazardous Waste Report (Based on 1999 Data), June 2001, EPA530-S-01-001 PB2001-106318

Table 27: Comparison of 1997, 1999, 2001, and 2003 BRS Statistics

	1997	1999	2001	2003
Quantity of RCRA Waste Reported for California	672,946 tons	427,302 tons	807,297 tons	445,317 tons
California rank nationwide, Quantity RCRA waste generated	12	16	16	16
Percent of U.S. Total	1.7%	1.1 %	2.0 %	1.5%
California rank nationwide, Number of Generators	2	2	1	1
Number of Generators in California	1,782	1,850	2,544	2514
Percent of U.S. Total	8.8%	9.2%	13.4%	14.2%
California RCRA Waste Imports	270,167 tons	161,748 tons	24,680 tons	37,951 Tons
California RCRA Waste Exports	207,119 tons	168,722 tons	442,670 tons	130,060 Tons
Source: U.S. EPA's Office of Solid Waste website at http://www.epa.gov/epaoswer/hazwaste/data/biennialreport/index.htm				

The results indicate that reported waste generation and management in California may vary significantly from one reporting cycle to another. The 2001 RCRA waste quantity (807,297 tons) is nearly double that reported in 1997 (437,302 tons). Furthermore the quantity of RCRA waste reported exported has more than doubled (from 168,722 tons to 442,670 tons). Finally, RCRA waste imports reported were down dramatically (from 168,722 to 24,680 tons) from 1999 to 2001. On the other hand, the 2003 figures indicate a dramatic decrease in both RCRA waste quantity (445,317 tons) and RCRA waste exports (130,060) from the previous reporting period. While these results imply changes in California's hazardous waste generation and management practices, further investigation will be necessary to determine their significance. It is also interesting to note that while California's count of generators is down (Table 26), the BRS reports an increase in number of generators by more than 30% (Table 27). Also, remember that some wastes are excluded from the BRS data, most notably, hazardous wastewater that is treated on site. These rankings therefore are inaccurate in that they only provide a picture of RCRA hazardous wastes that are not excluded from the BRS reporting requirements. Because the quantities of wastes that are excluded including and especially wastewater are so large, attempting to interpret Biennial Report System data with respect to how California compares to other States is very difficult.

Hazardous Waste Source Reduction Progress in California

DTSC is required by statute to "evaluate hazardous waste source reduction in this State, using the data . . . analysis" contained in this report. In this section, two approaches are used to get a sense of California's progress in reducing hazardous

waste generation. The first approach looks simply at hazardous waste generation as represented by quantities of waste that are manifested. The second uses California's Gross Domestic Product (GDP) figures from 1993 to 2004[23] to adjust the quantities manifested per changes in California's economic activity.

Difficulties in Measuring Pollution Prevention
Measuring pollution prevention accurately is difficult, especially when working with aggregated data. The more specific and focused the analysis is, the more accurate and useful it is likely to be. It is also inherently difficult to measure something that does not exist, such as waste or pollution that is never generated: the goal of P2 programs. Some of the problems associated with measuring pollution prevention are discussed below.

Normalization
Normalizing data allows an adjustment of amounts of waste or pollution per some factor, such as production levels. Without normalization, factors such as increases in population, increased (or decreased) production rates, changes in the number of generators, and other similar changes in production patterns may skew the data, rendering interpretation difficult. Making matters more difficult is the lack of a standard normalization factor across industries. What might make sense for one industry type (for example, amount of waste per gallon of paint produced) would be meaningless to another (a metal-plating shop). The problems inherent in normalizing waste generation make it very difficult to determine causes of changes in waste generation over time.

Variable Concentrations Of Chemical Constituents In Waste
Source reduction isn't just reducing quantities of generated waste. It also includes reducing a waste's toxicity, even if the quantity remains the same. Such reductions cannot be measured via the manifest system as long as the waste remains hazardous, because the manifest system does not include information about concentrations of a chemical, and therefore cannot be used to assess changes in toxicity over time. Only reductions in wastes that are so reduced in toxicity (and other hazardous waste criteria) that they no longer are classified as hazardous waste can appear as source reduction through manifest data analysis.

Multiple Chemical Constituents In Waste
Another confounding factor is the issue of multiple chemicals in waste streams. Many wastes contain mixtures of chemicals. A company's source reduction efforts may reduce or even eliminate one toxic chemical from a waste but, because other waste constituents remain, those source reduction accomplishments remain invisible in the data.

Changes In The Regulatory Structure
Changes in the definition of what is a hazardous waste will affect trends data. The data may indicate that California is succeeding in pollution prevention when what really happened is that wastes were declassified (see Appendix 2 for a list of wastes excluded

[23] GDP data for 2002 were not available.

from hazardous waste designation between 1993 and 1998). The opposite can occur as well. In 2001, DTSC reiterated that cathode ray tubes (CRT) in computer monitors and television displays are hazardous waste that must be managed as such. This will significantly affect future analyses of California's waste generation, because it is estimated that 315 million computers containing a total of 1.2 billion pounds of lead will become obsolete between 1997 and 2004.

Incomplete Data

Finally, as mentioned previously, we do not know the total quantity of hazardous waste generated in California. Therefore, we must use waste manifested as a surrogate in evaluating generation trends.

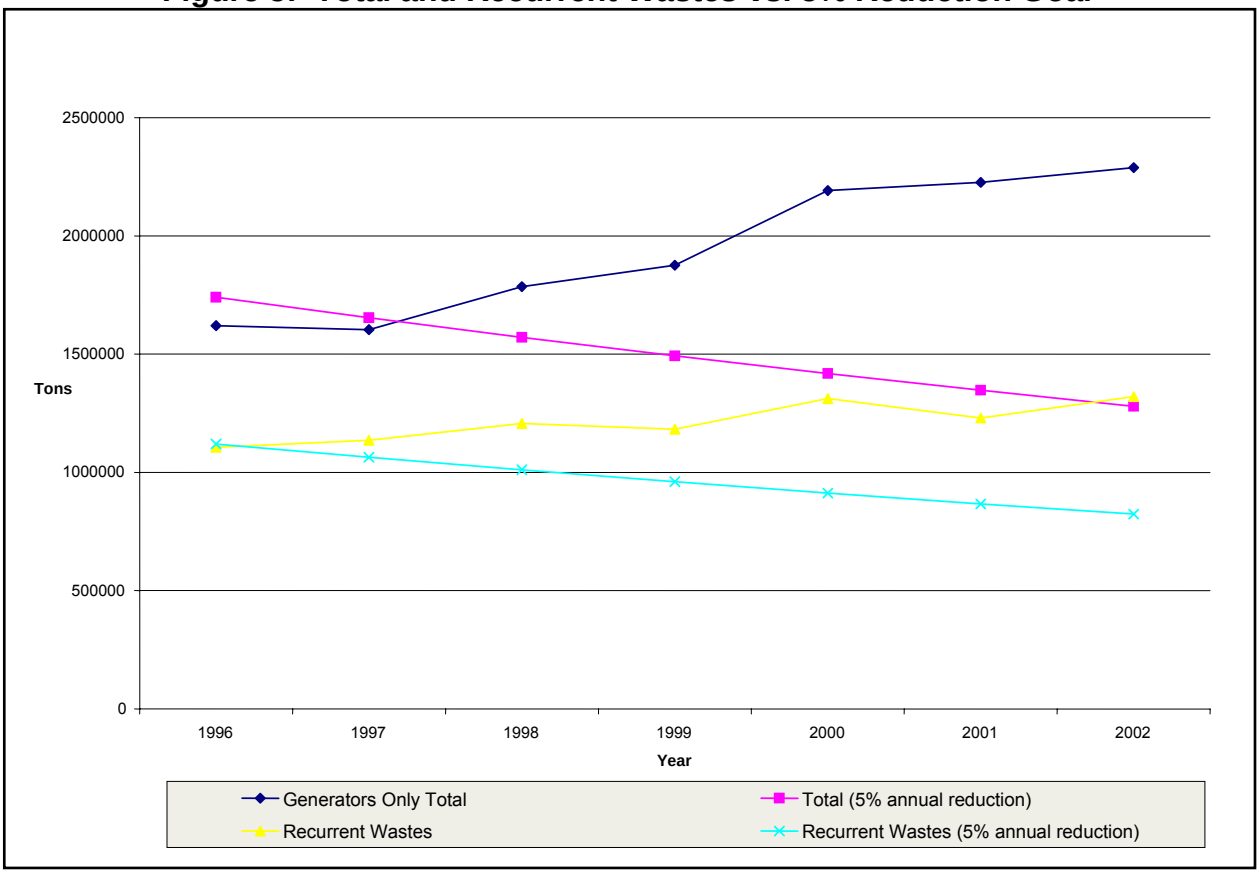
Analysis of Source Reduction Progress

Despite these difficulties, and with them in mind, we can get an overall picture of hazardous waste generation over time, and some indication of source reduction progress. Health & Safety Code section 25244.15(e) established a goal for California to reduce its hazardous waste generation 5% per year from 1993 to 2000. While this goal is no longer in effect, we will continue to look at this goal to get a sense of progress in California.

Hazardous Waste Generation as Represented by Manifested Waste Quantities

Figure 5 compares the total manifested waste from 1996 to 2003 to the 5% per year goal stated in law. Figure 5 also shows the comparison to the 5% goal using only recurrent wastes (rather than the total). California appeared to be meeting the goal for overall hazardous waste generation in 1996 and 1997 and for recurrent waste in 1996. However, increases in total waste from 1997 onward, and in recurrent waste from 1996 onward resulted in the divergence of generated waste and the reduction goal.

Figure 5: Total and Recurrent Wastes vs. 5% Reduction Goal



Waste Generation Normalized by Gross State Product

One interpretation is that the increase in waste generation is consistent with the levels of economic activity in California. To get a sense of California's waste generation trends in relation to economic activity, we normalized our hazardous waste generation data with State Domestic Product data.

Tables 28a,28b, and 28c contain the most current data available regarding waste generated and Gross State Product, Durable Goods subset (a subset of manufactured goods), and the Manufacturing subset. Also included are the values representing the goal of a 5% per annum reduction starting with 1993 as the base year.

Table 28a: California Gross State Product, 1993-2004

Year	Current Dollars (millions)	Recurrent Manifested Waste (tons)	5% per year SR goal (tons)	Tons waste/ million dollars	5% per year SR goal (tons/million dollars)
1993	847,579	898,829	898,829	1.06	1.06
1994	879,041	911,249	853,888	1.04	1.01
1995	925,931	1,307,194	811,193	1.41	0.96
1996	973,395	1,106,205	770,634	1.14	0.91
1997	1,045,254	1,135,517	732,102	1.09	0.86
1998	1,125,331	1,207,123	695,497	1.07	0.82
1999	1,213,355	1,182,905	660,722	0.97	0.78
2000	1,330,025	1,311,843	627,686	0.99	0.74
2001	1,359,265	1,229,933	596,302	0.90	0.70
2002	1,363,577*	1,195,902	566,487	0.88	0.66
2003	1,438,134*	1,226,360	538,163	0.85	0.63
2004	1,543,835*	1,380,411	511,254	0.89	0.60

Source: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.doc.gov/bea/regional/gsp/. See this document for additional detail.

* Revised June 2005: For years 2002 and 2003, the second column of Tables 12a, 12b, and 12c (Current Dollars in millions), are the June 2005 revised BEA estimates. For the years 1993 – 2001, the second column of Tables 12a, 12b, and 12c, (Current Dollars in millions), are not the June 2005 revised BEA estimates.

Table 28b: California Durable Goods Gross State Product, 1993 - 2004

Year	Current Dollars (millions)	Recurrent Manifested Waste (tons)	5% per year SR goal (tons)	Tons waste/ million dollars	5% per year SR goal (tons/million dollars)
1993	72,288	898,829	898,829	12.43	12.430
1994	74,344	911,249	853,888	12.26	11.809
1995	81,476	1,307,194	811,193	16.04	11.218
1996	86,785	1,106,205	770,634	12.75	10.657
1997	96,500	1,135,517	732,102	11.77	10.124
1998	100,950	1,207,123	695,497	11.96	9.618
1999	112,495	1,182,905	660,722	10.52	9.137
2000	124,548	1,311,843	627,686	10.53	8.680
2001	104,114	1,229,933	596,302	11.81	8.246
2002	96,176*	1,195,902	566,487	12.43	7.834
2003	101,691*	1,226,360	538,163	12.06	7.442
2004	n/a	1,380,411	511,254	n/a	7.070

Source: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.doc.gov/bea/regional/gsp/. See this document for additional detail.

* Revised June 2005

Table 28c: California Manufacturing Gross State Product, 1993 - 2004

Year	Current Dollars (millions)	Recurrent Manifested Waste (tons)	5% per year SR goal (tons)	Tons waste/ million dollars	5% per year SR goal (tons/million dollars)
1993	117,080	898,829	898,829	7.68	7.68
1994	119,740	911,249	853,888	7.61	7.30
1995	127,195	1,307,194	811,193	10.28	6.93
1996	134,669	1,106,205	770,634	8.21	6.58
1997	147,304	1,135,517	732,102	7.71	6.26
1998	155,626	1,207,123	695,497	7.76	5.94
1999	170,929	1,182,905	660,722	6.92	5.65
2000	187,017	1,311,843	627,686	7.01	5.36
2001	163,841	1,229,933	596,302	7.51	5.10
2002	150,046*	1,195,902	566,487	7.97	4.84
2003	161,707*	1,226,360	538,163	7.58	4.60
2004	n/a	1,380,411	511,254	n/a	4.37

Source: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.doc.gov/bea/regional/gsp/. See this document for additional detail.
* Revised June 2005

Figure 6a illustrates the upward trends of both Gross State Product in current dollars and recurrent waste generated in tons. Also included for reference are the values representing a 5% per annum decrease in recurrent waste with 1993 as the base year.

Figure 6a: Gross State Product

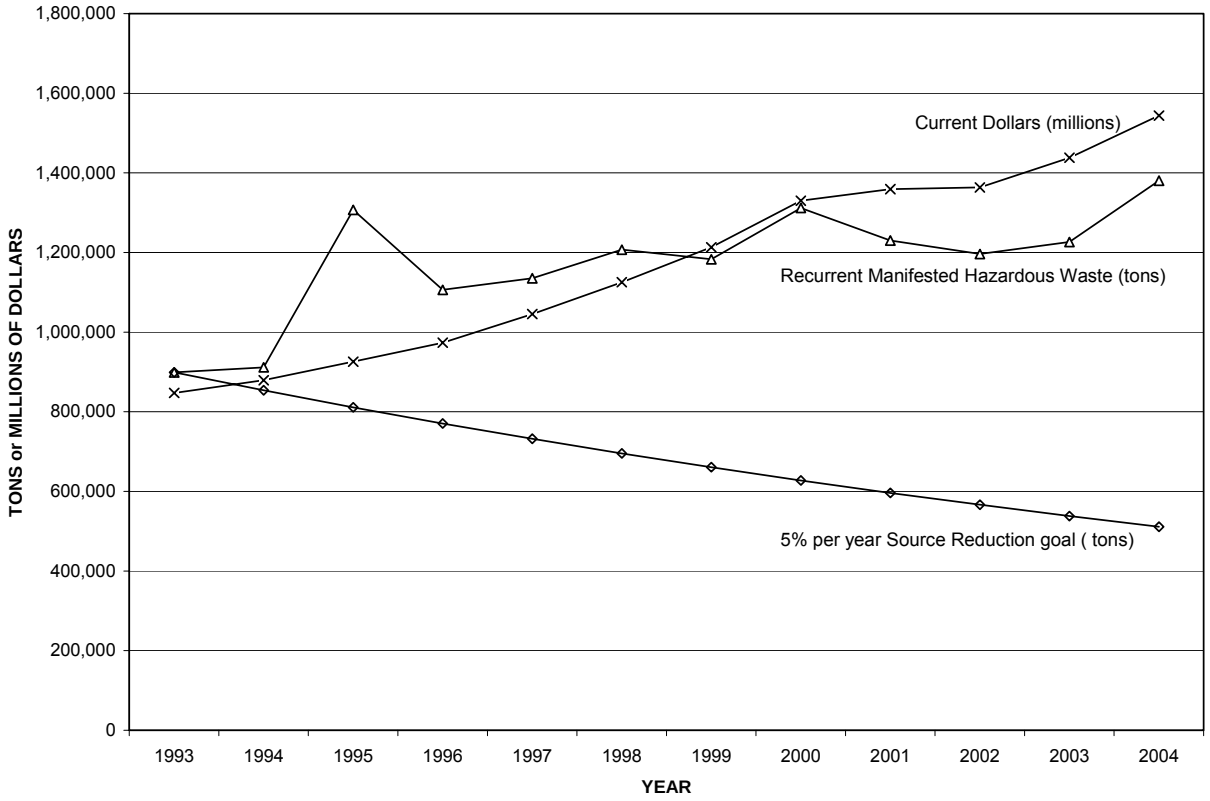
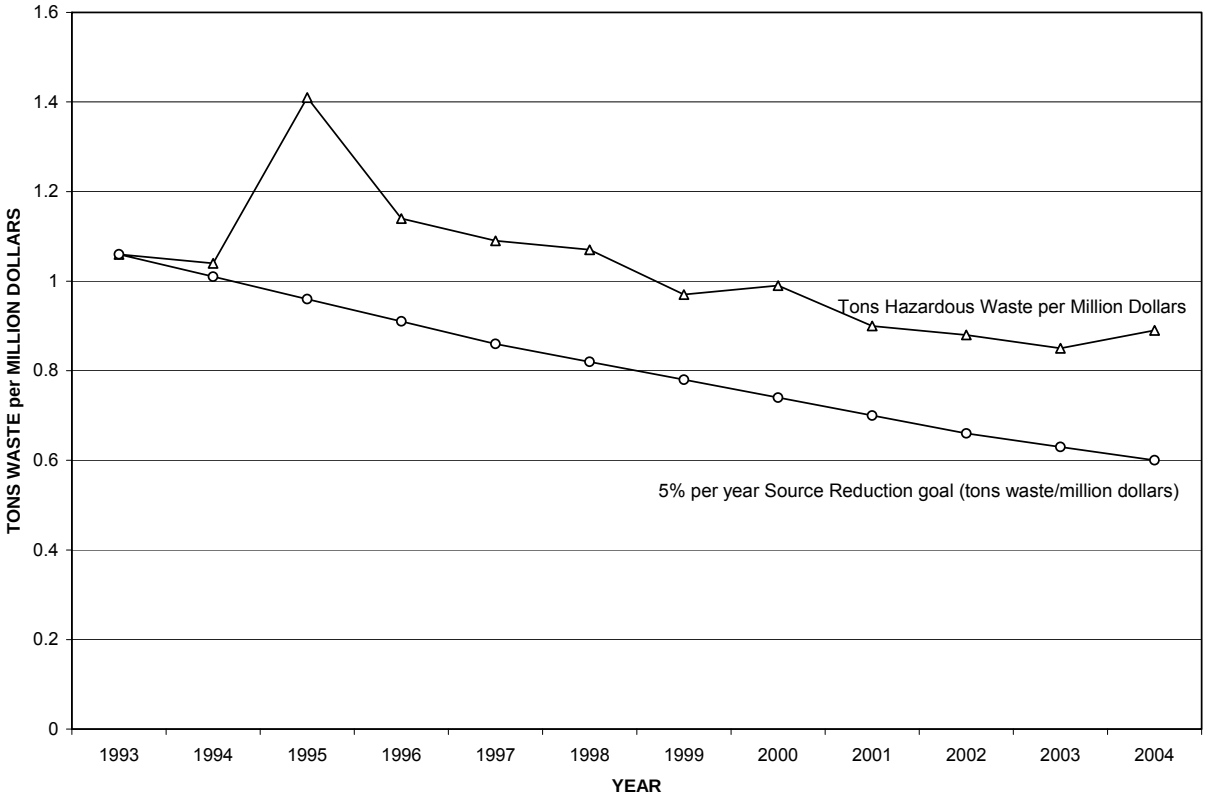


Figure 6b shows recurrent waste generation normalized to Gross State Product in current dollars. Also included for reference are the values representing a 5% per annum decrease in tons of recurrent waste per million dollars of Gross State Product with 1993 as the base year.

Figure 6b: California Gross State Product



We were concerned that the Gross State Product might prove too general an indicator, and could in fact be misleading due to the impact of activities unrelated (or too indirectly related) to waste generation that contribute to the metric. To reduce the likelihood of such effects, and to establish a more satisfying cause and effect relationship between waste generation and our chosen econometric indicators, we have selected some additional, more specific, and more relevant subsets of Gross State Product for correlation to our waste data.

Gross State Product is a broad-based, highly-aggregated econometric indicator that reflects an extreme diversity of market activities, many of which have no meaningful cause and effect relationship to hazardous waste generation. In an effort to look at waste generation in the context of a more closely correlated (and practically meaningful) econometric indicator, we looked at normalizing waste generation against durable goods, and manufacturing. Both of these are subsets of the Gross State Product, and constitute a logical starting point for a more focused analysis.

We expected that hazardous waste generation would be more closely correlated with durables than the state domestic product as a whole, and this appears to be the case. Likewise, we expected, and found, an even higher degree of correlation between waste generation and manufacturing.

Figure 6c plots recurrent waste generation and the Durables subset of Gross State Product (the 1995 waste data may warrant consideration as an "outlier"). Also included for reference are the values representing a 5% per annum decrease in tons of recurrent waste with 1993 as the base year.

Figure 6c: California Durable Goods

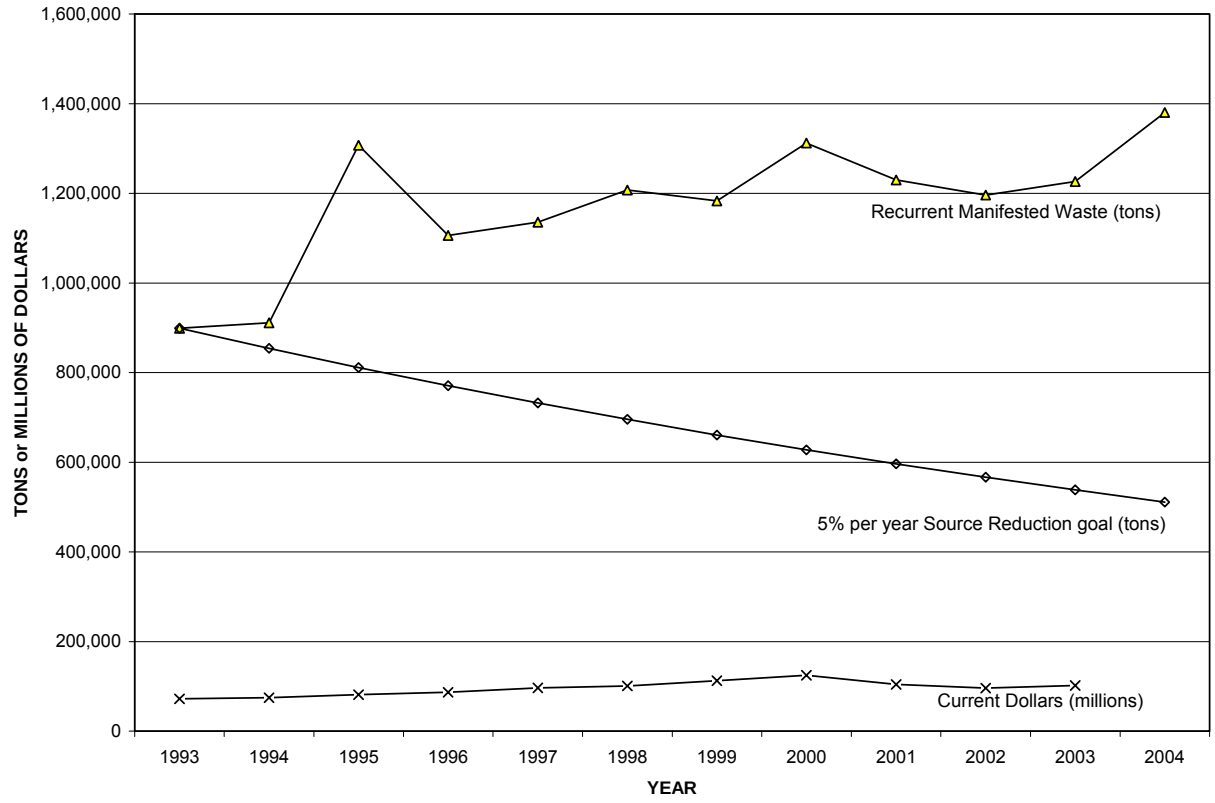


Figure 6d plots manufacturing activity and recurrent waste generation. Also included for reference are the values representing a 5% per annum decrease in tons of recurrent waste with 1993 as the base year.

Figure 6d: California Manufacturing

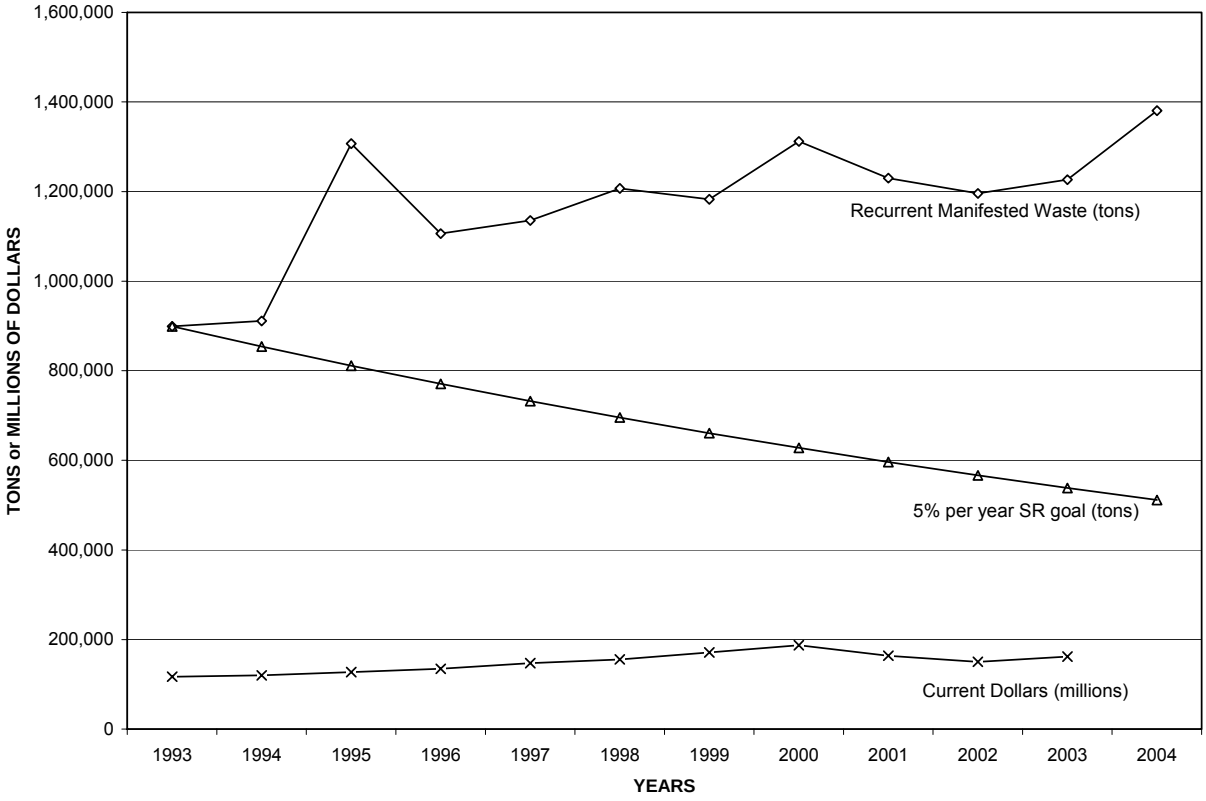


Figure 6e shows tons of recurrent waste per million dollars of durable goods. Also included for reference are the values representing a 5% per annum decrease in tons of recurrent waste per million dollars of the durable goods subset of Gross State Product with 1993 as the base year.

Figure 6e: California Durable Goods

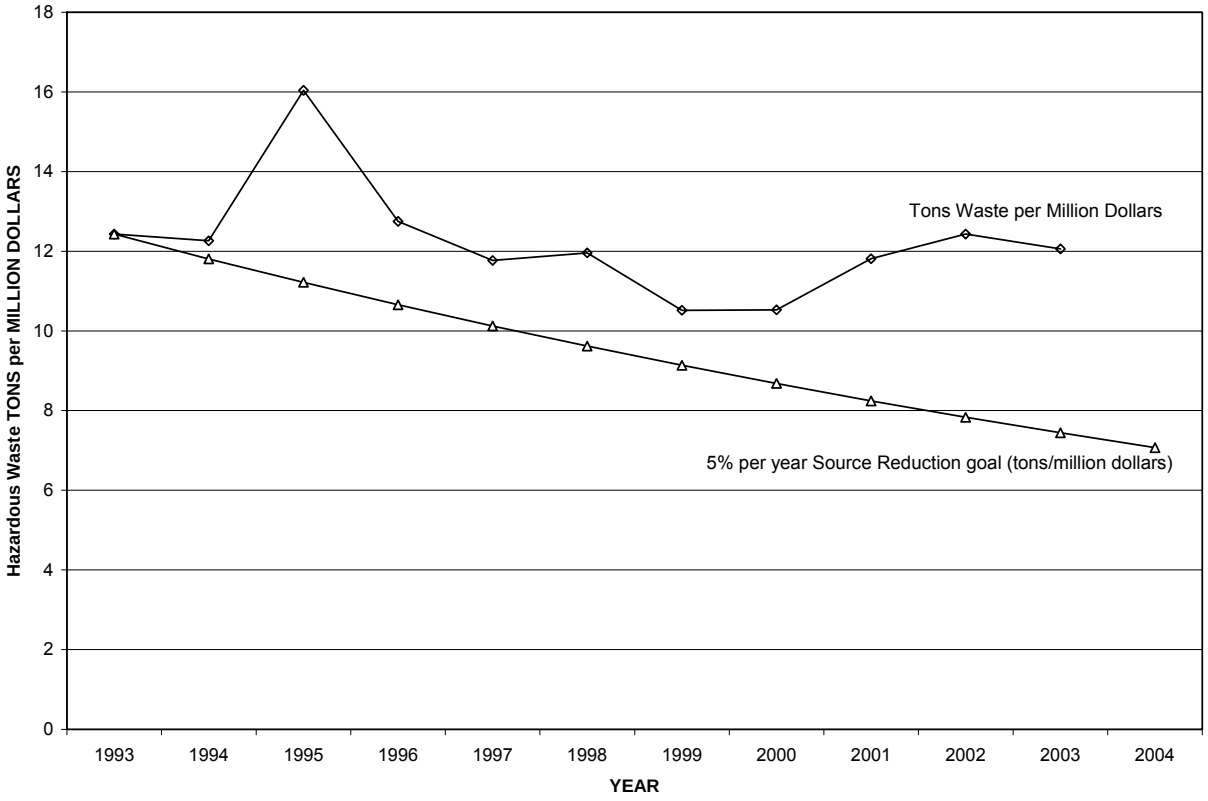
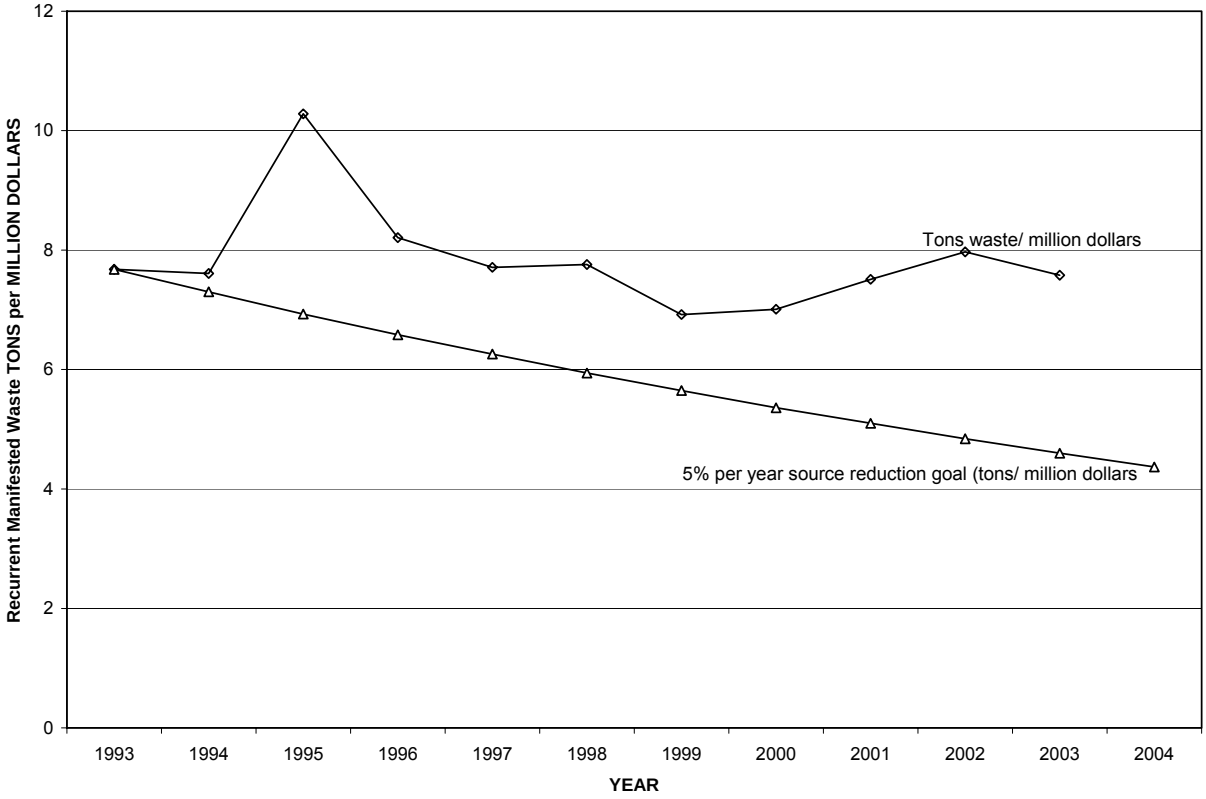


Figure 6f shows tons of recurrent waste per million dollars of Manufacturing. Also included for reference are the values representing a 5% per annum decrease in tons of recurrent waste per million dollars of the Durable Goods subset of Gross State Product with 1993 as base year.

Figure 6f: California Manufacturing, 1993-2001



Although waste per $M of Gross State Product appeared to be decreasing steadily through 2001 (dropping nearly 20% over 10yrs, from 1993-2003), the results were far less convincing when normalized against the more highly correlated indicators. Tons of waste per $M of durables decreased by only about 3% over the same ten years. Tons of waste per $M of manufacturing, the most closely correlated indicator of the three, decreased only 1.3%. For perspective, a 5% annual rate of decrease for the same 10 year period would have resulted in more than a 40% decrease in waste generation. Furthermore, while it appeared that waste per $M was decreasing, a possible trend reversal starting in 1999 is evident, particularly when looking at the data normalized against the more specific econometric indicators. While the overall trend of waste generated versus econometric indicators does arguably demonstrate a slight downward trend, variations by industry type, size, etc., will require further investigation before any compelling case can be made for “improvement”. Additional analysis may be useful in determining the relationship between hazardous waste generation and management, the activities that drive our economy, and the value of econometric approaches for assessing program priorities and policy implications.

Conclusion

Reaching conclusions about California's progress in reducing hazardous waste generation is difficult, given the limitations of available data and the complexities associated with measuring progress.[24] However, some things can be seen in this chapter. Two hazardous waste groups stand out as possible candidates for pollution prevention effort. First, the "organics" group is about twice as large as the next-largest waste group, and may be an appropriate target for hazardous waste source reduction efforts. However, this waste group contains California Waste Code 221, waste oil, the single-largest waste stream in California. Still, the organics waste group minus California Waste Code 221 constitutes a significant quantity of total waste manifested. Second, the "inorganics" waste group appears to be on an overall upward trend. Driving that upward trend is CWC 181 "other inorganic solid waste," which has been steadily increasing and constituted 19% of recurrent hazardous waste manifested in 2004.

It appears that total hazardous waste generation, as represented by manifested waste quantities, has been trending upwards after several years of apparent decline in the early nineties. Likewise, recurrent hazardous waste generation has been exhibiting an overall upward trend. However, recurrent waste generation normalized per Gross Domestic Product shows a 2% per year reduction from 1993 through 2003, while normalization against durables and manufacturing yield 0.3% and 0.13% per year reductions, respectively.

Total hazardous waste generation continues to increase in California. However, much of the increase continues to be associated with site clean-up activities (non-recurrent waste). This indicates progress in California as cleanups are being conducted, sites are being reclaimed for re-use, and fewer sources of unregulated contaminants are threatening the environment.

[24] Because of DTSC's role as regulator of hazardous wastes and substances, only manifest data were used in the conclusion to evaluate progress.

Part V:
A Selection of TRI Analyses for California

Previous reports prepared under SB 1916 have focused primarily on the State's manifest data set. For this report, we have added a closer look at U.S. EPA's Toxics Release Inventory (TRI) data.

Background[25]

The Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986 in response to concerns about releases of toxic chemicals. Several incidents, including the deadly releases in 1984 at a chemical plant in Bhopal, India, created demand for more information on the chemicals used and released at industrial facilities. In response, the Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986.

EPCRA's primary purpose is to inform communities and citizens of chemical hazards in their areas. Sections 311 and 312 of EPCRA require businesses to report the locations and quantities of chemicals stored on-site to State and local governments in order to help communities prepare to respond to chemical spills and similar emergencies. EPCRA Section 313 requires U.S. EPA and the States to annually collect data on releases and transfers of certain toxic chemicals from industrial facilities, and make the data available to the public in the Toxics Release Inventory (TRI). In 1990, Congress passed the Pollution Prevention Act which required that additional data on waste management and source reduction activities be reported under TRI. The goal of TRI is to empower citizens, through information, to hold companies and local governments accountable in terms of how toxic chemicals are managed.

EPA compiles the TRI data each year and makes it available through several data access tools, including the TRI Explorer and Envirofacts. There are other organizations which also make the data available to the public through their own data access tools, including Unison Institute which puts out a tool called "RTKNet" and Environmental Defense, which has developed a tool called "Scorecard."

The TRI program has expanded significantly since its inception in 1987. The Agency has issued rules to roughly double the number of chemicals included in the TRI to approximately 650. Seven new industry sectors have been added to expand coverage significantly beyond the original covered industries, i.e., manufacturing industries. Most recently, U.S. EPA has reduced the reporting thresholds for certain persistent, bioaccumulative, and toxic (PBT) chemicals in order to be able to provide additional information to the public on these chemicals.

The current TRI toxic chemical list contains 581 individually listed chemicals and 30 chemical categories (including 3 delimited categories containing 58 chemicals). If the members of the three delimited categories are counted as separate chemicals then the

25 TRI description copied and adapted from the U.S. EPA website at http://www.epa.gov/tri/whatis.htm; page accessed 8/20/05

total number of chemicals and chemical categories is 666 (i.e., 581 + 27 + 58). EPA has made chemical list changes through the chemical petitions process and EPA-initiated review, therefore, the TRI list of reportable toxic chemicals can vary from year to year. Core TRI Chemicals are chemicals that have been listed and reported to EPA under the Superfund Amendments Reauthorization Act (SARA) Section 313, since 1988. Chemicals not included in the core chemicals listing are delisted chemicals, chemicals added in 1990, 1991, 1994, 1995, and aluminum oxide, ammonia, hydrochloric acid, or sulfuric acid. A measure of core chemicals demonstrates progress over time on a static list of chemicals, thereby reducing perceived increases or decreased in emissions caused only by the addition or deletion of chemicals from the SARA 313 list.

TRI data have been instrumental in informing communities about what chemicals are released. As can be seen by the significant decrease in TRI chemicals reported since the inception of the program, TRI reporting has resulted in companies' increasing their source reduction efforts, at least for these reportable chemicals, as releases are being measured and made public. In addition, the data serve as a rough indicator of environmental progress over time.

Finally, U.S. EPA has proposed several changes to the TRI, which include reducing the reporting frequency from annual to biennial; raising reporting thresholds such that more facilities would be allowed to use the streamlined Form A in place of the more-detailed Form R (from 500 pounds to 5,000 pounds); and allowing the use of Form A (rather than Form R) for reporting certain quantities of persistent, bioaccumulative, and toxic chemicals (PBTs).[24]

Data Limitations

TRI data have certain limitations. TRI data reflect disposal or other releases and other waste management of chemicals, and not exposures of the public to those chemicals. TRI data alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment. TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from disposal or other release and other waste management activities which involve toxic chemicals.

It is also important to remember that TRI quantities generally represent estimates of pure chemical. It does not represent the total quantity of hazardous waste, for example; companies estimate pounds of reportable chemical within the hazardous waste stream.

About This Analysis

This analysis was conducted using U.S. EPA's "TRI Explorer."[26] TRI Explorer can generate four types of reports:

(1) State Fact Sheets (TRI data summarized from 2002 for an individual State or for the entire US);

26 TRI Explorer can be accessed online at http://www.epa.gov/triexplorer/

(2) Release Reports, including on- and off-site releases (i.e., off-site releases include transfers off-site to disposal and metals and metal compounds transferred to Publicly Owned Treatment Works; on-site releases include air emissions);
(3) Waste Transfer Reports (including amounts transferred off-site for further waste management but not including transfers off-site to disposal); and
(4) Waste Quantity Reports (including amounts recycled, burned for energy recovery, quantities treated, and quantities disposed of or otherwise released on- and off-site).[27]

This data presentation and analysis focuses on two of the above reports: "waste quantity" reports and "release" reports. Within the waste quantity category, we focus primarily on a report that adds all the waste quantity subreports (these are specific to management methods) into a total called "total production-related waste managed," which we then use as a surrogate for the total quantity of TRI chemicals generated by TRI reporters. Within TRI Explorer, "Total Production Related Waste Managed" is the sum of recycled on-site, recycled off-site, energy recovery on-site, energy recovery off-site, treated on-site, treated off-site, and quantities disposed of or otherwise released on- and off-site.

To make this data presentation easier to follow, it is organized first by TRI Explorer report type, followed by trends, then a presentation of selected TRI reports for 2003:

- Waste quantity reports
  - Waste quantity trends
  - Waste quantity current (2003) status, including information about specific chemicals, industries, and facilities
- Release reports
  - Release trends
  - A presentation of releases by industry, facility, and chemical categories (e.g., Hazardous Air Pollutants, OSHA Carcinogens, etc.)

Each table or figure will be labeled "waste quantity report" or "release report" as a reminder of which TRI Explorer report generated the data.

27 Information from the TRI Explorer website at http://www.epa.gov/triexplorer/background.htm. You can find more detailed and complete information about each report category here as well.

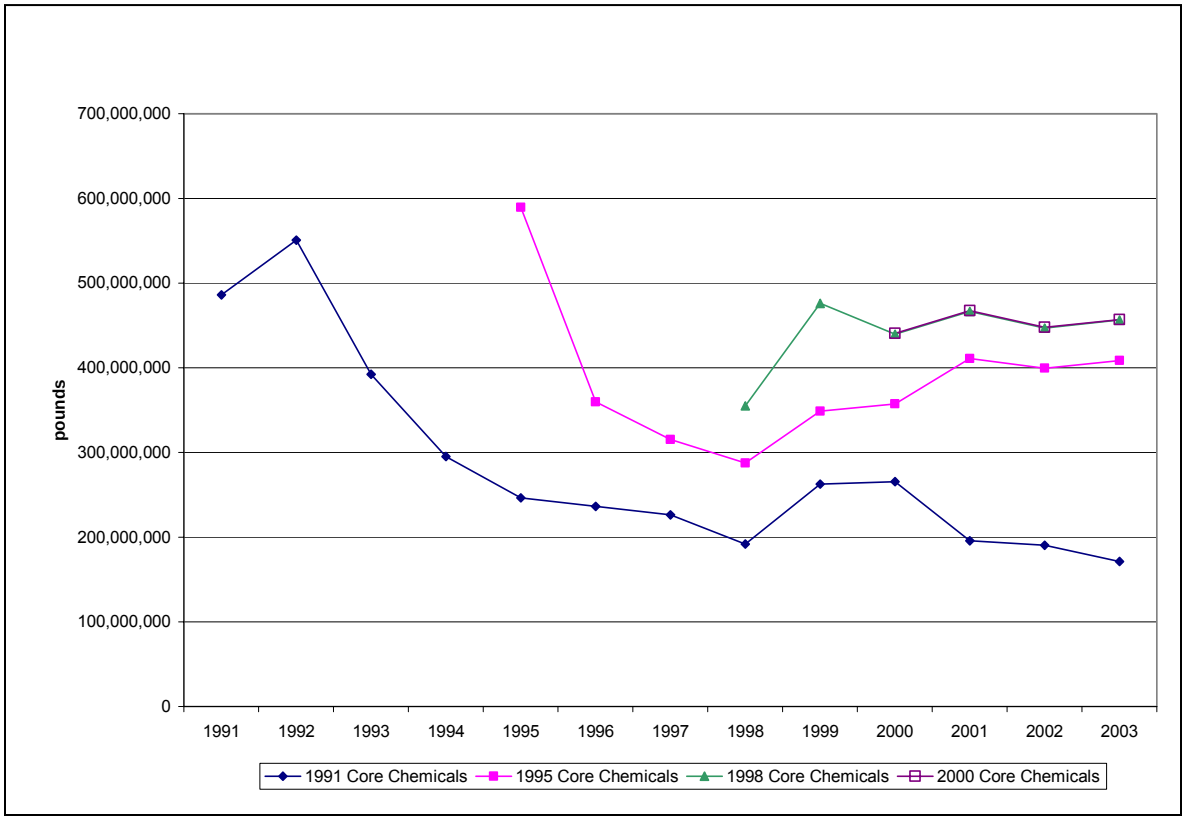
Waste Quantity Reports

Trends

First, we will look at TRI trends data. Because of changes in TRI reporting requirements over the years, TRI Explorer structures trends reports so that comparisons can be accurately made from year to year. For example, the 1988-2003 trends report only includes the original set of reportable chemicals, leaving out any chemicals or different thresholds subsequently established.

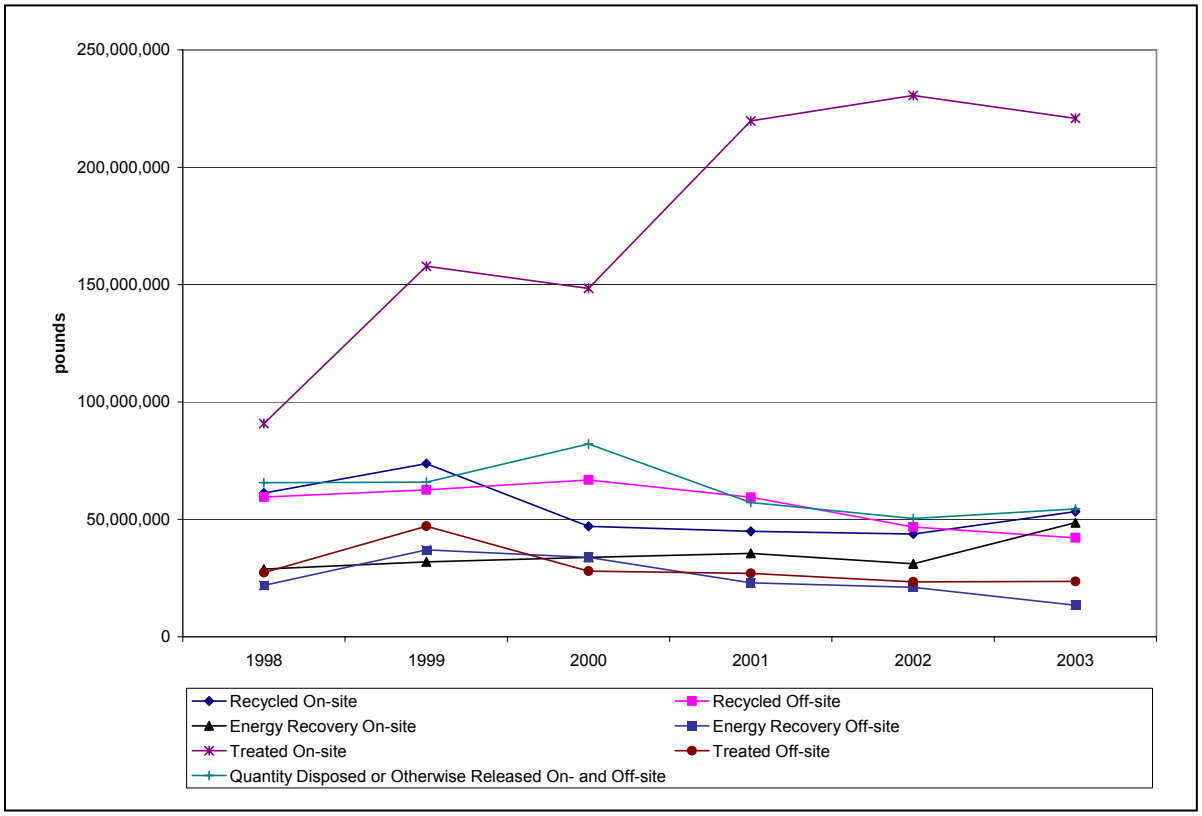
Figure 7 below shows trend lines for each of the four available core chemical lists in TRI Explorer, for total production-related waste managed.

Figure 7: Trends in Total Production-Related Waste Managed for Specific TRI Core Chemicals Lists



To illustrate the kind of information that can be seen using TRI Explorer, Figure 8 below breaks the 1998 Core Chemical list trend line of Figure 7 into general management categories. We can see here that increasing quantities of on-site treatment is driving the total upward. However, much more analysis would be needed, for each of the core chemical lists, to gain an understanding of the data.

Figure 8: Waste Quantity Trends by Management Method, 1998 Core Chemicals List



Tables 29, 30, and 31 below present some basic information about industries and chemicals, for 2003, the most recent year for which TRI data are available in TRI Explorer.

Table 29: Quantities of TRI Chemicals in Waste (in pounds), for All Chemicals, By Industry, California, 2003 (waste quantity report)

Row #	Industry	Total production-related waste managed	% of total California production-related waste managed for this industry
1	28 Chemicals	163,165,448	33.30%
2	29 Petroleum	112,949,893	23.05%
3	4953/7389 RCRA/Solvent Recovery	51,942,726	10.60%
4	33 Primary Metals	42,007,557	8.57%
5	34 Fabricated Metals	35,358,980	7.22%
6	20 Food	23,715,306	4.84%
7	36 Electrical Equip.	23,136,117	4.72%
8	37 Transportation Equip.	9,184,867	1.87%
9	30 Plastics	5,720,569	1.17%
10	26 Paper	4,485,141	0.92%
11	39 Miscellaneous	2,996,930	0.61%
12	No Reported Codes	2,843,111	0.58%
13	32 Stone/Clay/Glass	2,592,312	0.53%
14	35 Machinery	2,337,703	0.48%
15	38 Measure/Photo.	1,793,527	0.37%
16	5171 Petroleum Bulk Terminals	1,461,983	0.30%
17	22 Textiles	1,268,657	0.26%
18	49 Electric Utilities	1,215,003	0.25%
19	24 Lumber	1,039,525	0.21%
20	5169 Chemical Wholesalers	427,050	0.09%
21	25 Furniture	121,404	0.02%
22	27 Printing	116,121	0.02%
23	10 Metal Mining	37,678	0.01%
24	23 Apparel	17,261	0.00%
	Total	**489,934,869**	**100.00%**

Table 30: Quantities of TRI Chemicals in Waste (in grams), Dioxin and Dioxin-like

Industry	Total production-related waste managed	% of total California production-related waste managed for this industry
49 Electric Utilities	409.659	63.52%
33 Primary Metals	127.1676	19.72%
4953/7389 RCRA/Solvent Recovery	91.53	14.19%
29 Petroleum	10.9559	1.70%
32 Stone/Clay/Glass	2.642406	0.41%
28 Chemicals	1.2777	0.20%
30 Plastics	1.16	0.18%
26 Paper	0.3864382	0.06%
24 Lumber	0.12839	0.02%
Total	**644.9074342**	**100.00%**

Compounds, By Industry, California, 2003 (waste quantity report)

Table 31: Quantities of TRI Chemicals in Waste (in pounds) for facilities in All Industries for All Chemicals California 2003 (Waste Quantity report)

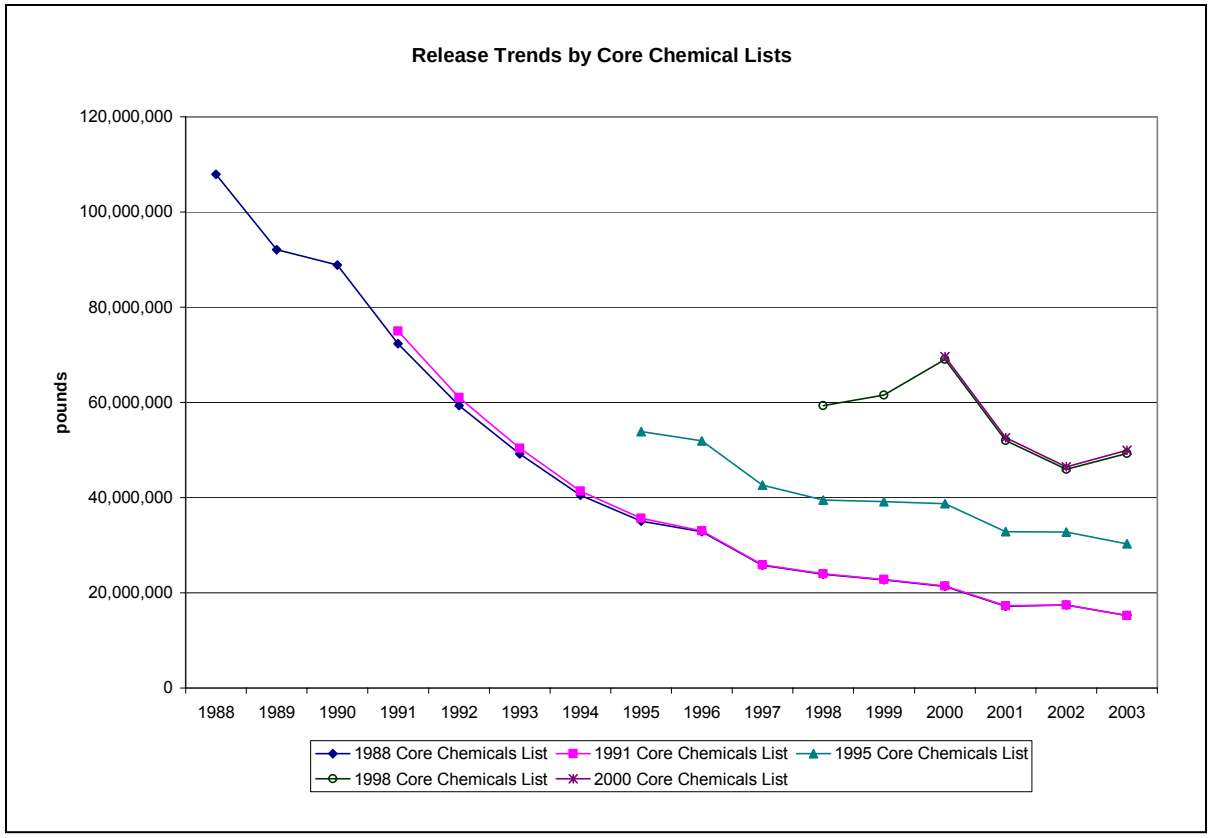
Row #	Chemical	Total production-related waste managed	% of total production-related waste managed
1	AMMONIA	184,155,926	37.59%
2	LEAD COMPOUNDS	31,072,487	6.34%
3	ETHYLENE GLYCOL	29,084,783	5.94%
4	NITRATE COMPOUNDS	23,130,570	4.72%
5	NITRIC ACID	19,120,808	3.90%
6	COPPER	16,201,539	3.31%
7	HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	14,620,722	2.98%
8	CARBONYL SULFIDE	13,417,218	2.74%
9	METHANOL	12,722,271	2.60%
10	COPPER COMPOUNDS	11,832,028	2.42%
11	ZINC COMPOUNDS	10,338,556	2.11%
12	PROPYLENE	9,347,610	1.91%
13	METHYL ETHYL KETONE	8,603,268	1.76%
14	TOLUENE	7,344,208	1.50%
15	XYLENE (MIXED ISOMERS)	6,769,464	1.38%
16	CERTAIN GLYCOL ETHERS	5,692,027	1.16%
17	N-METHYL-2-PYRROLIDONE	5,572,539	1.14%
18	ETHYLENE	5,502,070	1.12%
19	SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	5,444,739	1.11%
20	ASBESTOS (FRIABLE)	5,104,933	1.04%

21	N,N-DIMETHYLFORMAMIDE	4,865,883	0.99%
22	CARBON DISULFIDE	3,746,730	0.76%
23	STYRENE	3,613,415	0.74%
24	NICKEL COMPOUNDS	3,093,882	0.63%
25	DICHLOROMETHANE	2,971,631	0.61%
26	N-BUTYL ALCOHOL	2,398,421	0.49%
27	ZINC (FUME OR DUST)	2,391,466	0.49%
28	CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)	2,068,890	0.42%
29	NICKEL	2,045,067	0.42%
30	DIETHANOLAMINE	1,813,940	0.37%
31	LEAD	1,748,756	0.36%
32	PHENOL	1,721,651	0.35%
33	CHROMIUM	1,668,983	0.34%
34	METHYL ISOBUTYL KETONE	1,644,414	0.34%
35	N-HEXANE	1,555,522	0.32%
36	HYDROGEN FLUORIDE	1,494,568	0.31%
37	ETHYLENE OXIDE	1,450,929	0.30%
38	ALUMINUM (FUME OR DUST)	1,439,058	0.29%
39	TETRACHLOROETHYLENE	1,430,594	0.29%
40	ACETONITRILE	1,385,803	0.28%
41	1,2,4-TRIMETHYLBENZENE	1,153,328	0.24%
42	HYDROGEN CYANIDE	1,024,933	0.21%
43	CYANIDE COMPOUNDS	1,012,898	0.21%
44	MANGANESE	981,728	0.20%
45	ETHYLBENZENE	962,123	0.20%
46	FORMALDEHYDE	803,865	0.16%
47	ARSENIC COMPOUNDS	803,021	0.16%
48	BARIUM COMPOUNDS	787,337	0.16%
49	BENZENE	759,599	0.16%
50	CHLORINE	683,692	0.14%
Subtotal for top 50 chemicals		**478,599,895**	**97.69%**
Total		**489,934,869**	**100.00%**

Release Reports

As we presented in the waste quantity trends presentation, we will start here with a presentation of release trends. These quantities are of course a subset of those reported in Figure 8 (waste quantity trends).

Figure 9: Release Trends for Specific Core Chemical Lists, TRI Release Report



Air Emissions

Tables 32 and 33 show fugitive, point source and total air emissions, by industry. Air emissions were chosen because air releases are of obvious interest to workers and communities.

Table 32: TRI On-site and Off-site Air Emissions (fugitive and point source) (in pounds), for All Chemicals, By Industry, California, 2003 (release report)

Industry	On-site Fugitive Air	% of total fugitive air	On-site Point Source Air	% of total on-site point source air	% fugitive of total air emissions for this industry	Total air emissions	% of total air emissions
20 Food	307,838	7.80%	771,034	5.42%	28.53%	1,078,872	5.94%
22 Textiles	12,076	0.31%	40,056	0.28%	23.16%	52,132	0.29%
23 Apparel	0	0.00%	17,261	0.12%	0.00%	17,261	0.09%
24 Lumber	143,336	3.63%	357,755	2.52%	28.60%	501,091	2.76%
25 Furniture	6,202	0.16%	36,256	0.25%	14.61%	42,458	0.23%
26 Paper	4,612	0.12%	351,911	2.47%	1.29%	356,523	1.96%
27 Printing	33,847	0.86%	4,359	0.03%	88.59%	38,207	0.21%
28 Chemicals	879,870	22.29%	831,964	5.85%	51.40%	1,711,834	9.42%
29 Petroleum	426,464	10.80%	6,563,332	46.14%	6.10%	6,989,797	38.47%
30 Plastics	412,823	10.46%	1,600,403	11.25%	20.51%	2,013,227	11.08%
32 Stone/Clay/Glass	49,658	1.26%	840,646	5.91%	5.58%	890,304	4.90%
33 Primary Metals	112,876	2.86%	76,553	0.54%	59.59%	189,429	1.04%
34 Fabricated Metals	499,839	12.66%	670,785	4.72%	42.70%	1,170,624	6.44%
35 Machinery	52,795	1.34%	3,418	0.02%	93.92%	56,214	0.31%
36 Electrical Equip.	131,589	3.33%	171,957	1.21%	43.35%	303,546	1.67%
37 Transportation Equip.	692,119	17.53%	925,055	6.50%	42.80%	1,617,174	8.90%
38 Measure/Photo.	981	0.02%	48,162	0.34%	2.00%	49,144	0.27%
39 Miscellaneous	33,679	0.85%	146,019	1.03%	18.74%	179,698	0.99%
No Reported Codes	36,033	0.91%	85,895	0.60%	29.55%	121,928	0.67%
10 Metal Mining	30,182	0.76%	1,065	0.01%	96.59%	31,247	0.17%
49 Electric Utilities	302	0.01%	543,758	3.82%	0.06%	544,060	2.99%
5169 Chemical Wholesalers	19,388	0.49%	25,957	0.18%	42.76%	45,345	0.25%
5171 Petroleum Bulk Terminals	49,760	1.26%	92,898	0.65%	34.88%	142,658	0.79%
4953/7389 RCRA/Solvent Recovery	10,932	0.28%	17,187	0.12%	38.88%	28,119	0.15%
Total	**3,947,202**	**100.00%**	**14,223,688**	**100.00%**	21.72%	**18,170,890**	**100.00%**

Orange, yellow and green highlights indicate the top 3, respectively.

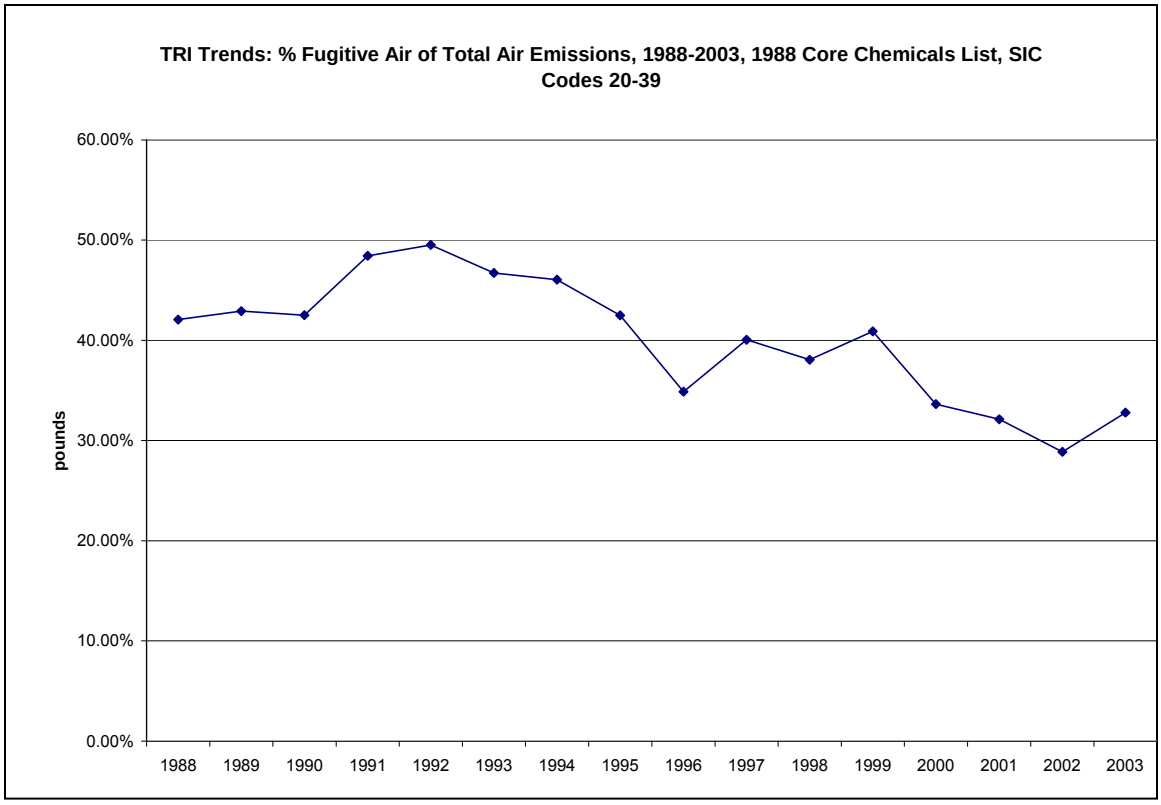
Table 33: TRI Air Emissions (in grams), Dioxin and Dioxin-like Compounds, By Industry, California, 2003 (release report)

Industry	On-site Fugitive Air	% of fugitive total	On-site Point Source Air	% of point source total	total air emissions	% of total air emissions
24 Lumber	0	0.00%	0.12175	0.67%	0.12175	0.67%
26 Paper	0	0.00%	0.3726105	2.04%	0.3726105	2.04%
28 Chemicals	0.0033	66.00%	0	0.00%	0.0033	0.02%
29 Petroleum	0	0.00%	3.685257	20.18%	3.685257	20.17%
30 Plastics	0	0.00%	1.16	6.35%	1.16	6.35%
32 Stone/Clay/Glass	0	0.00%	5.182406	28.37%	5.182406	28.36%
33 Primary Metals	0	0.00%	4.4936	24.60%	4.4936	24.59%
49 Electric Utilities	0.0017	34.00%	2.65	14.51%	2.6517	14.51%
4953/7389 RCRA/Solvent Recovery	0	0.00%	0.6	3.28%	0.6	3.28%
Total	**0.005**	**100.00%**	**18.265624**	**100.00%**	**18.270624**	**100.00%**

Orange, yellow and green highlights indicate the top 3, respectively.

Figure 10 shows the percent of fugitive air emissions of total air emissions (fugitive plus point source) for the 1988 Core Chemical list. While considerable more information would be needed to draw any conclusions, it may be that the declining trend here represents improvements over time in the management of air releases.

Figure 10: Fugitive Air as a Percentage of Total Air Releases (release report)



Industries Releasing Hazardous Air Pollutants (HAPS)

48% of the Hazardous Air Pollutants group of chemicals was released (on- and off-site) by SIC 4953/7389 RCRA/Solvent Recovery. These SIC codes represent off-site facilities (defined in TRI Explorer as "Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste treatment and disposal facilities (SIC code 4953)" and "Solvent Recovery Services (SIC code 7389)."

Table 34: Industries TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds) for Hazardous Air Pollutant Chemicals by Industry California 2003 (release report)

Row #	Industry	Total On- and Off-site Disposal or Other Releases	% of total
1	4953/7389 RCRA/Solvent Recovery	14,372,320	48.39%
2	30 Plastics	1,937,552	6.52%
3	26 Paper	1,580,780	5.32%
4	29 Petroleum	1,564,195	5.27%
5	37 Transportation Equip.	1,370,503	4.61%
6	28 Chemicals	1,191,653	4.01%
7	32 Stone/Clay/Glass	1,042,762	3.51%
8	34 Fabricated Metals	947,804	3.19%
9	20 Food	494,040	1.66%
10	24 Lumber	560,710	1.89%
11	49 Electric Utilities	325,085	1.09%
12	39 Miscellaneous	1,448,673	4.88%
13	No Reported Codes	133,753	0.45%
14	5171 Petroleum Bulk Terminals	146,476	0.49%
15	33 Primary Metals	2,275,324	7.66%
16	36 Electrical Equip.	112,129	0.38%
17	38 Measure/Photo.	49,038	0.17%
18	27 Printing	38,216	0.13%
19	25 Furniture	35,376	0.12%
20	5169 Chemical Wholesalers	31,070	0.10%
21	22 Textiles	20,790	0.07%
22	23 Apparel	17,261	0.06%
23	35 Machinery	2,189	0.01%
24	10 Metal Mining	414	0.00%
	Total	**29,698,115**	**100.00%**

Note that in Table 34 above and subsequent tables, waste management facilities, as represented by "4953/7389 RCRA/Solvent Recovery," release significant quantities of TRI chemicals. It may be that these quantities represent materials used and sent off-site for management by smaller businesses (those not required to report to TRI). Since U.S. EPA makes an effort to eliminate double-counting, we are assuming that these figures do not include materials sent to these facilities by TRI reporters.

Table 35: Industries Releasing OSHA Carcinogens (release report)

Row #	Industry	Total On- and Off-site Disposal or Other Releases	% of total
1	4953/7389 RCRA/Solvent Recovery	14,368,615	69.98%
2	30 Plastics	1,747,197	8.51%
3	37 Transportation Equip.	629,950	3.07%
4	32 Stone/Clay/Glass	384,849	1.87%
5	No Reported Codes	163,178	0.79%
6	28 Chemicals	227,279	1.11%
7	24 Lumber	311,889	1.52%
8	39 Miscellaneous	112,722	0.55%
9	29 Petroleum	242,446	1.18%
10	34 Fabricated Metals	223,097	1.09%
11	20 Food	47,291	0.23%
12	38 Measure/Photo.	32,340	0.16%
13	33 Primary Metals	1,876,591	9.14%
14	26 Paper	25,188	0.12%
15	5171 Petroleum Bulk Terminals	21,461	0.10%
16	23 Apparel	17,261	0.08%
17	25 Furniture	14,483	0.07%
18	5169 Chemical Wholesalers	12,564	0.06%
19	36 Electrical Equip.	62,412	0.30%
20	49 Electric Utilities	8,660	0.04%
21	35 Machinery	2,273	0.01%
22	10 Metal Mining	394	0.00%
23	27 Printing	16	0.00%
24	22 Textiles	0	0.00%
	Total	**20,532,154**	**100.00%**

Table 36: Air Emissions Evaluation, Industries Releasing OSHA Carcinogens (release report)

Row #	Industry	On-site Fugitive Air	On-site Point Source Air	total air	% fugitive air of total air for this industry	Total On-site Disposal or Other Releases	% of total On-site Disposal or Other Releases
1	4953/7389 RCRA/Solvent Recovery	2,191	2,129	4,319	50.72%	13,980,264	79.78%
2	30 Plastics	269,174	1,437,951	1,707,125	15.77%	1,707,151	9.74%
3	37 Transportation Equip.	168,619	396,386	565,005	29.84%	565,753	3.23%
4	32 Stone/Clay/Glass	22,688	159,809	182,498	12.43%	340,764	1.94%
5	No Reported Codes	2,742	15,015	17,757	15.44%	153,097	0.87%
6	28 Chemicals	43,454	69,673	113,127	38.41%	132,256	0.75%
7	24 Lumber	11,444	108,824	120,268	9.52%	121,289	0.69%
8	39 Miscellaneous	17,005	95,179	112,185	15.16%	112,185	0.64%
9	29 Petroleum	43,560	62,121	105,681	41.22%	109,429	0.62%
10	34 Fabricated Metals	27,991	75,116	103,106	27.15%	103,924	0.59%
11	20 Food	15,139	9,626	24,765	61.13%	47,027	0.27%
12	38 Measure/Photo.	244	29,377	29,621	0.82%	29,704	0.17%
13	33 Primary Metals	1,078	5,201	6,279	17.17%	28,314	0.16%
14	26 Paper	10	23,239	23,249	0.04%	23,909	0.14%
15	5171 Petroleum Bulk Terminals	6,664	10,973	17,636	37.78%	17,753	0.10%
16	23 Apparel	0	17,261	17,261	0.00%	17,261	0.10%
17	25 Furniture	2,962	10,921	13,883	21.34%	13,883	0.08%
18	5169 Chemical Wholesalers	5,110	7,446	12,556	40.70%	12,564	0.07%
19	36 Electrical Equip.	179	3,134	3,312	5.40%	3,436	0.02%
20	49 Electric Utilities	1	118	118	0.44%	2,349	0.01%
21	35 Machinery	495	287	783	63.31%	787	0.00%
22	10 Metal Mining	381	3	384	99.32%	393	0.00%
23	27 Printing	0	0	1	50.00%	1	0.00%
24	22 Textiles	0	0	0	100.00%	0	0.00%
	Total	**641,132**	**2,539,787**	**3,180,919**	**20.16%**	**17,523,492**	**100.00%**

Table 37: TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for Persistent, Bioaccumulative, and Toxic Chemicals, by Industry, California, 2003 (release report)

Row #	Industry	Total On- and Off-site Disposal or Other Releases	% of total
1	4953/7389 RCRA/Solvent Recovery	6,625,486	78.65%
2	33 Primary Metals	1,323,361	15.71%
3	32 Stone/Clay/Glass	182,215	2.16%
4	No Reported Codes	147,413	1.75%
5	37 Transportation Equip.	44,999	0.53%
6	36 Electrical Equip.	31,029	0.37%
7	28 Chemicals	22,808	0.27%
8	34 Fabricated Metals	16,131	0.19%
9	29 Petroleum	15,235	0.18%
10	30 Plastics	4,795	0.06%
11	49 Electric Utilities	3,356	0.04%
12	5171 Petroleum Bulk Terminals	2,331	0.03%
13	38 Measure/Photo.	1,393	0.02%
14	26 Paper	1,356	0.02%
15	22 Textiles	688	0.01%
16	24 Lumber	503	0.01%
17	10 Metal Mining	468	0.01%
18	35 Machinery	250	0.00%
19	20 Food	231	0.00%
20	39 Miscellaneous	28	0.00%
21	27 Printing	16	0.00%
22	5169 Chemical Wholesalers	8	0.00%
23	25 Furniture	0	0.00%
	Total	**8,424,099**	**100.00%**

Table 38: Evaluation of On-site vs. Off-site Releases, TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for Persistent, Bioaccumulative, and Toxic Chemicals, By Industry, California, 2003 (release report)

Row #	Industry	Total On-site Disposal or Other Releases	% on-site of total	Total Off-site Disposal or Other Releases	% offsite of total	Total On- and Off-site Disposal or Other Releases
1	4953/7389 RCRA/Solvent Recovery	6,456,738	97.45%	68,748	2.55%	6,625,486
2	33 Primary Metals	4,274	0.32%	1,319,087	99.68%	1,323,361
3	32 Stone/Clay/Glass	145,570	79.89%	36,645	20.11%	182,215
4	No Reported Codes	136,897	92.87%	10,516	7.13%	147,413
5	37 Transportation Equip.	774	1.72%	44,226	98.28%	44,999
6	36 Electrical Equip.	2,644	8.52%	28,385	91.48%	31,029
7	28 Chemicals	19,427	85.17%	3,381	14.83%	22,808
8	34 Fabricated Metals	295	1.83%	15,836	98.17%	16,131
9	29 Petroleum	3,816	25.05%	11,419	74.95%	15,235
10	30 Plastics	29	0.60%	4,766	99.40%	4,795
11	49 Electric Utilities	2,299	68.51%	1,057	31.49%	3,356
12	5171 Petroleum Bulk Terminals	323	13.86%	2,008	86.14%	2,331
13	38 Measure/Photo.	110	7.89%	1,283	92.11%	1,393
14	26 Paper	39	2.90%	1,317	97.10%	1,356
15	22 Textiles	56	8.10%	632	91.90%	688
16	24 Lumber	441	87.70%	62	12.30%	503
17	10 Metal Mining	468	99.94%	0	0.06%	468
18	35 Machinery	138	55.40%	111	44.60%	250
19	20 Food	230	99.35%	2	0.65%	231
20	39 Miscellaneous	10	34.47%	18	65.53%	28
21	27 Printing	1	3.42%	15	96.58%	16
22	5169 Chemical Wholesalers	8	100.00%	0	0.00%	8
23	25 Furniture	0		0		0
	Total	**6,774,585**	**80.42%**	**1,649,514**	**19.58%**	**8,424,099**

Note that if you remove the solvent recovery facilities, this picture reverses, and for the remaining industries, 82% of the PBT chemicals are managed or released off-site rather than on-site (analysis not shown here). This is because almost all of the quantity associated with “4953/7389 RCRA/Solvent Recovery” is in the “RCRA Subtitle C Landfill” category, which is within the “on-site” category of TRI.

Conclusion

This brief analysis was conducted to provide an overview of the information contained in the TRI data set. The overall trend in total production-related waste managed shows a decline in TRI chemicals, with some of the more-recent core chemical lists showing more steady production. The release trends show a more consistent decline in TRI chemical releases.

Appendix 1

Background Information on TRI Explorer

TRI Explorer can generate four types of reports:

(1) State Fact Sheets (TRI data summarized from 2002 for an individual State or for the entire US);
(2) Release Reports (including on- and off-site releases (i.e., off-site releases include transfers off-site to disposal and metals and metal compounds transferred to Publicly Owned Treatment Works (POTWs);
(3) Waste Transfer Reports (including amounts transferred off-site for further waste management but not including transfers off-site to disposal); and
(4) Waste Quantity Reports (including amounts recycled, burned for energy recovery, quantities treated, and quantities disposed of or otherwise released on- and off-site).

Chemical
Users can select an individual chemical or multiple chemicals, a "core chemicals" set or a "group of chemicals". The "core chemicals" sets are: *1988 Core chemicals*, *1991 Core Chemicals*,*1995 Core Chemicals*, *1998 Core Chemicals*, and *2000 Core Chemicals*. The specific "group of chemicals" are: *1995 new chemicals*, *Hazardous Air Pollutants*, *Occupational Safety Health Administration (OSHA) carcinogens*, *Metals and metal compounds*, and *Persistent Bioaccumulative, and Toxic (PBT) chemicals*. *All chemicals* can also be selected; they are defined as all reportable chemicals in a selected year. For the TRENDS report grouping (output type) only one of the "Core Chemicals" set or an individual chemical can be selected (see TRENDS REPORTS below).

Industry
The user can select a single Industry sector or multiple industry sectors. All industry sectors can also be selected. The list of industry sectors varies according to the year selected. Since 1988, TRI has focused on waste management activities of the manufacturing sector-facilities classified as being primarily in SIC codes 20-39. In 1998, EPA added the following industry sectors:

- Metal mining (SIC code 10, except for SIC codes 1011,1081, and 1094);
- Coal mining (SIC code 12, except for 1241 and extraction activities);
- Electrical utilities that combust coal and/or oil (SIC codes 4911, 4931, and 4939);
- Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste treatment and disposal facilities (SIC code 4953);
- Chemicals and allied products wholesale distributors (SIC code 5169);
- Petroleum bulk plants and terminals (SIC code 5171); and
- Solvent recovery services (SIC code 7389)

Who must report?

In general, facilities identified in the table below that have the equivalent of 10 or more full-time employees and meet established thresholds for manufacture, processing, or "otherwise use" of listed chemicals (i.e., manufactures or processes over 25,000 pounds of the approximately 600 designated chemicals or 28 chemical categories specified in the regulations, or uses more than 10,000 pounds of any designated chemical or category) must report their releases and other waste management quantities (including quantities transferred off-site for further waste management).[28] There are separate and specific reporting thresholds for certain substances (e.g., lead, dioxin).

Standard Industrial Classification (SIC) Codes in TRI Reporting[29]
The list of industries subject to reporting under the TRI program is commonly divided into two groups: "Original" and "New". Original Industries are those covered under the original legislation. New Industries are those which were added in 1998.

Original Industries: Standard Industrial Classification (SIC) Codes 20-39

SIC	Industry Group
20	Food
21	Tobacco
22	Textiles
23	Apparel
24	Lumber and Wood
25	Furniture
26	Paper
27	Printing and Publishing
28	Chemicals
29	Petroleum and Coal
30	Rubber and Plastics
31	Leather
32	Stone, Clay, and Glass
33	Primary Metal
34	Fabricated Metals
35	Machinery (excluding electrical)
36	Electrical and Electronic Equipment
37	Transportation Equipment
38	Instruments
39	Miscellaneous Manufacturing

28 This description from the State of Colorado's website at http://www.cdphe.state.co.us/el/sara/trireport.html
29 Information copied from TRI Explorer website at http://www.epa.gov/tri/report/siccode.htm#new_industries

New Industries Reporting to TRI as of the 1998 Reporting Year

SIC	Industry Group
10	Metal mining (except for SIC codes 1011,1081, and 1094)
12	Coal mining (except for 1241 and extraction activities)
4911, 4931, and 4939	Electrical utilities that combust coal and/or oil (SIC codes 4911, 4931, and 4939)
4953	Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste treatment and disposal facilities (SIC code 4953)
5169	Chemicals and allied products wholesale distributors (SIC code 5169)
5171	Petroleum bulk plants and terminals (SIC code 5171)
7389	Solvent recovery services (SIC code 7389)

What are the reporting categories?

Release Report (Reporting Year 2003)
Total On-site Disposal or Other Releases
- Underground Injection on-site to Class I Wells
- RCRA Subtitle C Landfill
- Other On-site Landfills
- Fugitive Air Emissions
- Point Source Air Emissions
- Surface Water Discharges
- Underground Injection on-site to Class II - V Wells
- Land Treatment
- RCRA Subtitle C Surface Impoundments
- Other Surface Impoundments
- Other On-site Land Disposal

Total Off-site Disposal or Other Releases
- Transfer To Underground Injection Class I Wells
- Transfers to RCRA Subtitle C Landfills
- Transfers to Other Landfills
- Transfer To Storage Only
- Transfer To Solidification/Stabilization (metals only)
- Transfer To Disposal Wastewater Treatment (metals only)
- Transfer To POTWs (metals only)
- Transfer To Underground Injection Class II-V Wells
- Transfer To RCRA Subtitle C Surface Impoundments
- Transfer To Other Surface Impoundments
- Transfers to Land Treatment
- Transfers to Other Land Disposal
- Transfers to Other Off-Site Management
- Transfers to Waste Broker for Disposal
- Transfers to Unknown Waste Management

Total On-site and Off-site Releases

Waste Transfer Report

- Transfers to Recycling
- Transfers to Energy Recovery
- Transfers to Treatment
- Transfers to POTWS (non-metal TRI chemicals)
- Transfers to POTWs (metals and metal compounds)
- Other Off-site Transfers
- Other Transfers Off-site for Disposal or Other Releases, not including transfers to POTWs of metals and metal compounds
- Total Transfers Off-site for Further Waste Management

Waste Quantity Report (Reporting Year 2003)

- Recycled On-site
- Recycled Off-site
- Energy Recovery On-site
- Energy Recovery Off-site
- Treated On-site
- Treated Off-site
- Total On-site Disposal to Class I Underground Injection Wells, RCRA Subtitle C Landfills, and Other Landfills
- Total Other On-site Disposal or Other Releases
- Total Off-site Disposal to Class I Underground Injection Wells, RCRA Subtitle C Landfills, and Other Landfills
- Total Other Off-site Disposal or Other Releases
- Total Production-related Waste Managed
- Non-production-related Waste Managed (Waste Due to Catastrophic or One Time Events)

Waste Quantity Report(Reporting Years 1991-2002)

- Recycled On-site
- Recycled Off-site
- Energy Recovery On-site
- Energy Recovery Off-site
- Treated On-site
- Treated Off-site
- Quantity Disposed of or Otherwise Released On- and Off-site
- Total Production-related Waste Managed
- Non-production-related Waste Managed (Waste Due to Catastrophic or One Time Events)

Trends Reports

Year-to-year comparison must be based on a consistent set of chemicals to assure that any changes in releases or other waste management do not simply reflect the addition, deletion, or change in definition or reportable chemicals from one year to another. Trend reports can be done for a set of "Core Chemicals" or for an individual chemical.

It is important to understand the definition of the "Core Chemicals" sets as you use the TRI Explorer to look at annual trends. Depending upon the base year, core chemicals include only those chemicals that were reported in all years (i.e., 1988 core chemicals include only those chemicals that were reported for all years between 1988 and the latest reporting year). Those chemicals that were added or removed from the TRI list would not be included in the trend analysis.

1988 Core chemicals -- chemicals listed for reporting years 1988 and later, except for aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid (note that the definitions for these four chemicals changed in various years). Certain chemicals were added to the TRI list in 1990, 1991, 1994, and 1995, and other chemicals were delisted since 1988. These chemicals are not included in the 1988 Core Chemical list. The 1988 Core Chemicals set is found in the Release Report and the Waste Transfer Report.

1991 Core chemicals -- chemicals listed for reporting years 1991 and later, except for ammonia, hydrochloric acid and, sulfuric acid (note: that the definitions for these chemicals changed in various years). In 1991, under the Pollution Prevention Act of 1990, EPA began collecting information on source reduction and recycling activities on TRI's Form R. These chemicals are not included in the 1991 Core Chemicals list. The 1991 Core Chemical set is found in the Release Report, the Waste Transfer Report, and the Waste Quantity Report.

1995 Core chemicals -- chemicals listed for reporting years 1995 and later. In 1995, 286 additional chemicals and chemical compounds were added to TRI. The 1995 Core Chemical set is found in the Release Report, the Waste Transfer Report, and the Waste Quantity Report.

2000 Core chemicals -- chemicals listed for reporting years 2000 and later, except for lead and lead compounds. The 2000 Core Chemicals set is found in the Release Report, the Waste Transfer Report, and the Waste Quantity Report.

Making Year-to-Year Comparisons of TRI Data (from TRI website)

Year-to-year comparisons must be based on a consistent set of reporting requirements to assure that any changes in the data do not simply reflect expansion of TRI's chemical and industry coverage or other modifications in reporting requirements over the course of the years. Therefore, trend analyses have been undertaken using various baseline years, as described below. Chemicals that have been removed from the TRI list ("delisted" chemicals) are excluded from all of the year-to-year comparisons.

2000-2002
For 2000, EPA made changes to the list of chemicals that must be reported and to reporting thresholds for some chemicals. EPA has the authority both to add chemicals to the TRI reporting list if they meet the statutory toxicity criteria and to delete chemicals from the list if EPA determines that they do not meet the toxicity criteria. For the 2000 reporting year, PBT chemicals already on the list had the reporting thresholds lowered and other PBT chemicals were added to the list. In addition, vanadium compounds were added to the list and the qualifier for vanadium was changed to exclude vanadium when contained in alloys starting with the reporting year 2000. These chemicals are included for analyses covering the 2000-2002 period, but not for periods covering years prior to 2000. The reporting thresholds for the PBTs lead and lead compounds were lowered starting with the reporting year 2001. Lead and lead compounds are not included for analyses covering the 2000-2002 period or for periods covering years prior to 2001.

Additional considerations also apply to analyses of TRI data for 2000-2002. Beginning with reporting year 2002, amounts sent off-site to landfills/disposal surface impoundments are reported in three separate categories (RCRA Subtitle C landfills, other landfills, and surface impoundments). These types of transfers to disposal or other releases cannot be analyzed separately for years prior to 2002.

1998-2002
Chemicals whose reporting requirements changed starting with the 2000 or 2001 reporting year (see above) are excluded for analyses covering the 1998-2002 period. Seven industry sectors were required to report starting with the 1998 reporting year, including metal mining, coal mining, electric utilities, chemical wholesale distributors, petroleum bulk storage/terminals, hazardous waste management facilities and solvent recovery facilities. These industries are included for analyses covering the 1998-2002 period, but not for periods covering years prior to 1998.

1995-2002
Chemicals added to TRI in EPA's chemical expansion initiative were first reportable in 1995. These chemicals are included for analyses covering the 1995-2002 period, but not for periods covering years prior to 1995. PBT chemicals whose reporting requirements changed starting with the 2000 or 2001 reporting year (see above) are excluded for analyses covering the 1995-2002 period. Since 1995, EPA has deleted

three chemicals from the TRI list, including phosphoric acid in 1999. These chemicals are excluded from all analyses of multi-year data. Also, reporting by the seven industries added to the TRI starting with the 1998 reporting year is excluded from the 1998, 1999, 2000, 2001 and 2002 data for analyses covering the 1995-2002 period.

Additional considerations also apply to analyses of TRI data for 1995 to 2002: Beginning with reporting year 1996, the amounts injected underground into Class I wells are reported separately from amounts injected into underground wells of other classes (II-V), and on-site land disposal in RCRA Subtitle C landfills separately from other types of on-site landfills. These types of disposal or other releases cannot be analyzed separately for years prior to 1996.

1991-2002
Reporting requirements for ammonia, hydrochloric acid, and sulfuric acid have changed since 1991. Analyses for the period 1991-2002 exclude chemicals added to TRI since 1991 and those for which reporting requirements have changed over that time. Also, reporting by the seven industries added to the TRI starting with the 1998 reporting year is excluded from the 1998, 1999, 2000, 2001 and 2002 data for analyses covering the 1991-2002 period.

Waste management information added to TRI by the Pollution Prevention Act of 1990 has been collected since 1991. In addition, reporting on off-site transfers to recycling and on off-site transfers to energy recovery were added in 1991. Therefore, waste quantity reports are available only for analyses covering the years 1991-2002, but not for periods covering years prior to 1991. Also, waste transfer reports that include transfers to recycling and energy recovery are available for analyses covering years 1991-2002, but not for periods covering years prior to 1991.

1988-2002
Analyses for the period 1988 to 2002 exclude chemicals added to TRI since 1988 and those for which reporting requirements have changed over that time. This includes chemicals described above as well as aluminum oxide whose qualifier changed to "fibrous forms" for the 1989 reporting year. Also, reporting by industries required to report starting with the 1998 reporting year is excluded from the 1998, 1999, 2000, 2001 and 2002 data for analyses covering the 1988-2002 period.

Waste management information added to TRI by the Pollution Prevention Act of 1990 has been collected since 1991. In addition, reporting on off-site transfers to recycling and on off-site transfers to energy recovery were added in 1991. Therefore, waste quantity reports are not available for analyses covering the years 1988-2002, and waste transfer reports do not include transfers to recycling and energy recovery for analyses covering the years 1988-2002.

Appendix 2

Wastes Excluded from Hazardous Waste Designation Between 1993 and 1998

RCRA Waste Streams

debris 261.3, 40 CFR
recovered oil from petroleum refining, exploration and production 261.4(a)(12)
excluded scrap metal 261.4 (a)(13)
shredded circuit boards (14)
condensates from kraft mill steam strippers (15)
secondary materials from the primary mineral processing industry (16)
used oil refining distillation bottoms 261.4(b)(14)
residues of waste in empty containers 261.7(a)(1)
universal wastes (batteries, pesticides, mercury thermostats, HH and conditionally exempt small qty generator waste) 261.9
residues derived from the burning or processing of hazardous waste in an industrial furnace 266.112
military munitions 266.202

Non-RCRA Waste Streams

intermediate manufacturing process streams 25124(c)(1)
acetic acid 25145(b)(2)(B)(i)
aluminum chloride (ii)
ammonium bromide (iii)
ammonium sulfate
anisole
boric acid
calcium fluoride
calcium formate
calcium propionate
cesium chloride
magnesium chloride
potassium chloride
sodium bicarbonate
sodium borate decahydrate
sodium carbonate
sodium chloride
sodium iodide
sodium tetraborate
oils commonly used as food flavorings (xix)
wastes exceeding a TTLC 25141.5(b)(3)(A) and (B)

wastes from the extraction, beneficiation, and processing of ores and minerals 25143.1(b)(1)
treated wood waste 25143.1.5
cementitious material 25143.8(a)
debris contaminated with petroleum 25143.12
wastes containing silver 25143.13
dry cell batteries 25216
human surgery specimens or tissue 117635 Health and Safety Code
pharmaceuticals 11747 Health and Safety Code
pulping liquors 66261.4(a)(4)
secondary materials (a)(5)
infectious wastes (b)(1)
used oil re-refining distillation bottoms (b)(3)
used chlorofluorocarbon refrigerants (b)(4)

Appendix 3

TRI Reporting Categories

Air Releases
Total releases to air include all TRI chemicals emitted by a plant from both its stack(s) as well "fugitive" sources (such as leaking valves).

Stack Air Releases
Releases to air occur through confined air streams such as stacks, vents, ducts or pipes. These are also called point source releases.

Fugitive Air Releases
This category includes releases to air that do not occur through a confined air stream, including equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems. These releases are also called releases from non-point sources.

Water Releases
Releases to water include discharges to streams, rivers, lakes, oceans and other bodies of water (but not ground water). This includes releases from both point sources, such as industrial discharge pipes, and non-point sources, such as stormwater runoff, but not releases to sewers or other off-site wastewater treatment facilities.

Land Releases
Land releases include all the chemicals disposed on land within the boundaries of the reporting facility, and can include any of the following types of on-site disposal:

RCRA Subtitle C Landfills
This category includes wastes buried on-site in landfills regulated by RCRA Subtitle C.

Other On-Site Landfills
This category includes wastes buried on-site in landfills that are not regulated by RCRA.

Land Treatment/Application Farming
This category includes wastes that are applied or incorporated into soil.

Surface Impoundments
Surface impoundments are uncovered holding ponds used to volatilize (evaporate wastes into the surrounding atmosphere) or settle waste materials.

Other Land Disposal
This category includes other forms of land disposal, including accidental spills or leaks.

Underground Injection
Underground injection releases fluids into a subsurface well for the purpose of waste disposal. Wastes containing TRI chemicals are injected into either Class I wells or Class V wells.

Other Injection Wells include Class II, III, and IV wells.
Class I Injection Wells are industrial, municipal, and manufacturing wells injecting liquid wastes into deep, confined, and isolated formations below potable water supplies.

Class II oil- and gas-related wells re-injection of produced fluids for disposal, enhanced recovery of oil, or hydrocarbon storage.

Class III wells are associated with the solution mining of minerals.

Class IV wells include the injection of hazardous or radioactive fluids directly or indirectly into underground sources of drinking water (USDW), only if the injection is part of an authorized CERCLA/RCRA clean-up operation.

Class V wells are generally used to inject non-hazardous wastes into or above an underground source of drinking water. Class V wells include all types of injection wells that do not fall under I-IV. They are generally shallow drainage wells, such as floor drains connected to dry wells or drain fields.

Offsite Transfers
TRI also tracks off-site transfers to various types of facilities such as Publicly Owned Treatment Works (municipal sewage treatment plants), treatment and disposal facilities, as well as recycling and energy recovery facilities.

Publicly Owned Treatment Works (POTW)
A POTW is a wastewater treatment facility that is owned by a State or municipality. Wastewaters from facilities reporting under TRI are transferred through pipes or sewers to a POTW. Some chemicals, such as metals, may be removed, but are not destroyed and may be disposed of in landfills or discharged to receiving waters; transfers of metals and metal compounds to POTWs are categorized as off-site releases.

Treatment and Disposal
Toxic chemicals in wastes that are transferred off-site may be treated through a variety of methods, including biological treatment, neutralization, incineration, and physical separation. These methods typically result in varying degrees of destruction of the toxic chemicals. Toxic chemicals in wastes that are transferred off-site for disposal generally are released to land at an off-site facility or are injected underground.

Recycling and Energy Recovery

Toxic chemicals in wastes sent off-site for the purposes of recycling are generally recovered by a variety of recycling methods, including solvent recovery and metals recovery. Toxic chemicals in wastes sent off-site for purposes of energy recovery are combusted off-site in industrial furnaces (including kilns) or boilers that generate heat or energy for use at that location. Both of these management methods (recycling and energy recovery) are considered to be recycling within the TRI data system. Incineration is not considered to be energy recovery and is therefore not included within the recycling category.

Appendix 4

California Waste Codes

California Nonrestricted Wastes

Inorganics

121. Alkaline solution (pH> or = 12.5) with metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, or zinc)
122. Alkaline solution without metals (pH > or = 12.5)
123. Unspecified alkaline solution
131. Aqueous solution (2 < pH < 12.5) containing reactive anions (azide, bromate, chlorate, cyanide, fluoride, hypochlorite, nitrite, perchlorate, and sulfide anions)
132. Aqueous solution with metals (< restricted levels and see 121)
133. Aqueous solution with total organic residues 10 percent or more
134. Aqueous solution with total organic residues less than 10 percent
135. Unspecified aqueous solution
141. Off-specification, aged, or surplus inorganics
151. Asbestos-containing waste
161. FCC waste
162. Other spent catalyst
171. Metal sludge (see 121)
172. Metal dust (see 121) and machining waste
181. Other inorganic solid waste

Organics

211. Halogenated solvents (chloroform, methyl chloride, perchloroethylene, etc.)
212. Oxygenated solvents (acetone, butanol, ethyl acetate, etc.)
213. Hydrocarbon solvents (benzene, hexane, Stoddard, etc.)
214. Unspecified solvent mixture
221. Waste oil and mixed oil
222. Oil/water separation sludge
223. Unspecified oil-containing waste
231. Pesticide rinse water
232. Pesticides and other waste associated with pesticide production
241. Tank bottom waste
251. Still bottoms with halogenated organics
252. Other still bottom waste
261. Polychlorinated biphenyls and material containing PCBs
271. Organic monomer waste (includes unreacted resins)
272. Polymeric resin waste
281. Adhesives

291. Latex waste
311. Pharmaceutical waste
321. Sewage sludge
322. Biological waste other than sewage sludge
331. Off-specification, aged, or surplus organics
341. Organic liquids (nonsolvents with halogens)
342. Organic liquids with metals (see 121)
343. Unspecified organic liquid mixture
351. Organic solids with halogens
352. Other organic solids

Solids

411. Alum and gypsum sludge
421. Lime sludge
431. Phosphate sludge
441. Sulfur sludge
451. Degreasing sludge
461. Paint sludge
471. Paper sludge/pulp
481. Tetraethyl lead sludge
491. Unspecified sludge waste

Miscellaneous

511. Empty pesticide containers 30 gallons or more
512. Other empty containers 30 gallons or more
513. Empty containers less than 30 gallons
521. Drilling mud
531. Chemical toilet waste
541. Photochemicals/photoprocessing waste
551. Laboratory waste chemicals
561. Detergent and soap
571. Fly ash, bottom ash, and retort ash
581. Gas scrubber waste
591. Baghouse waste
611. Contaminated soil from site clean-ups
612. Household wastes
613. Auto-shredder waste

California Restricted Wastes

"Restricted" wastes cannot be land filled unless they are treated to certain specifications.

711. Liquids with cyanides > or = 1000 Mg/L
721. Liquids with arsenic > or = 500 Mg/L
722. Liquids with cadmium > or = 100 Mg/L
723. Liquids with chromium (VI) > or = 500 Mg/L
724. Liquids with lead > or = 500 Mg/L
725. Liquids with mercury > or = 20 Mg/L
726. Liquids with nickel > or = 134 Mg/L
727. Liquids with selenium > or = 100 Mg/L
728. Liquids with thallium > or = 130 Mg/L
731. Liquids with polychlorinated biphenyls > or = 50 Mg/L
741. Liquids with halogenated organic compounds > or = 1000 Mg/L
751. Solids or sludges with halogenated organic compounds > or = 1000 mg/Kg
791. Liquids with pH < or = 2
792. Liquids with pH < or = 2 with metals
801. Waste potentially containing dioxins